ENBD_facebook_sentiment_analysis

July 9, 2018

In [1]:
```
import nltk
import pandas as pd
from matplotlib import pyplot as plt
import seaborn as sns
from textblob import TextBlob as tb
from datetime import datetime
```

In [2]:
```
# data consists of all posts and comments on ENBD fb page since 2015/5/29, Source: Faceb
data = pd.read_csv("facebook_data.csv", sep = ";")
data = data.dropna(axis = 0)
data.head()
```

Out[2]:

	level	id	parent_id	object_id	object_type	query_status	query_time	query_type	created_time	message
1	1	2	1	254094394708288_1695660977218282	data	fetched (200)	2018-07-08 22:48:52.398990	Facebook:<user>/posts	2018-07-08T16:00:01+0000	We are bringing to you another session of #Ask...
2	1	3	1	254094394708288_1693988240718889	data	fetched (200)	2018-07-08 22:48:52.398990	Facebook:<user>/posts	2018-07-07T16:00:00+0000	Do you know how far your food travels from far...
3	1	4	1	254094394708288_1692259267558453	data	fetched (200)	2018-07-08 22:48:52.398990	Facebook:<user>/posts	2018-07-06T12:00:01+0000	Grab your coffee on the move. Make contactless...
4	1	5	1	254094394708288_1690904381027275	data	fetched (200)	2018-07-08 22:48:52.398990	Facebook:<user>/posts	2018-07-05T15:01:36+0000	You can win an iPhone X easily! Here is how yo...
5	1	6	1	254094394708288_1689382777846102	data	fetched (200)	2018-07-08 22:48:52.398990	Facebook:<user>/posts	2018-07-04T16:00:01+0000	Explore the best places to visit this year wit...

In [3]:
```
f = lambda x: datetime.strptime(x.split("T")[0], "%Y-%m-%d")
data["created_datetime"] = data.created_time.map(f)
```

In [4]:
```
#Create dataframes for posts and comments
posts = pd.DataFrame(data[["created_datetime","message"]][data.level == 1].values, colum
comments = pd.DataFrame(data[["created_datetime","message"]][data.level == 2].values, co
```

In [5]:
```
#Sample posts
posts.Text.values.tolist()[:5]
```

Out[5]:
```
['We are bringing to you another session of #AskEmiratesNBD . This session will be with
 'Do you know how far your food travels from farm to plate? Reduce your food miles and s
 'Grab your coffee on the move. Make contactless payments with your card or phone. Use E
 'You can win an iPhone X easily! Here is how you can win: 1.         Follow us on Faceb
 'Explore the best places to visit this year with the list of cultural cities. Read more
```

In [6]:
```
#Sample comments
comments.Text.values[5:10]
```

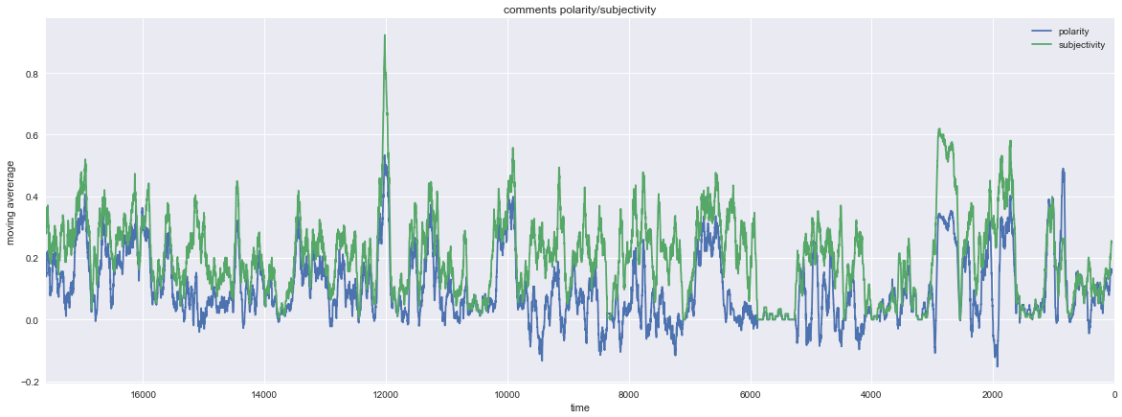
Out[6]:
```
array([ "Yes NBD no one called me to fix the activation issue till now !!!! I just recei
       "Very bad experience. I would never expect for a card activation to take more tha
       "As of now I have been waiting  over a week to get a call back about opening  a n
       'Still waiting for a call back from customer services. Please can you call ASAP.
       'Brazil   won 5 times World Cup  1958,1962,1970,1994,2002.  following on Instagra
```

In [7]:
```
#Clean text for sentiment analysis
alphabet = list("abcdefghijklmnopqrstuvwxyzABCDEFGHIJKLMNOPQRSTUVWXYZ")
alphabet.append(" ")

def isenglish(word):
    r = [letter for letter in list(word) if letter in alphabet]
    if len(r)< len(word): return False
    else: return True

def clean(text):
    words = [word for word in nltk.word_tokenize(text) if word.isalpha()]
    english_words = [x for x in words if isenglish(x)]
    return " ".join(english_words)

posts["Clean Text"] = posts["Text"].map(clean)
comments["Clean Text"] = comments["Text"].map(clean)
```

In [20]:
```
# The textblob library consists of a pretrained Naive Bayes Analyser
 polarity = lambda x : tb(x).sentiment.polarity
 subjectivity = lambda x : tb(x).sentiment.subjectivity

 comments["polarity"] = comments["Clean Text"].map(polarity)
 comments["subjectivity"] = comments["Clean Text"].map(subjectivity)
 comments["sentiment_index"] = list(zip(comments.subjectivity.values, comments.polarity.
```

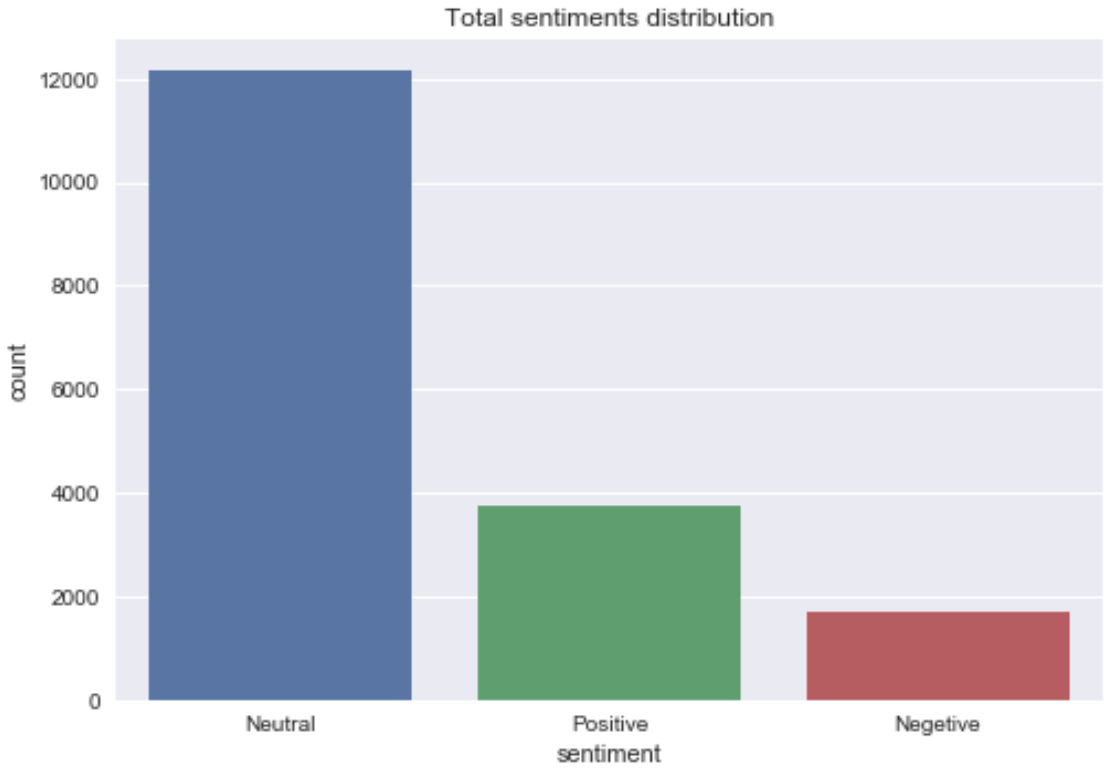
In [9]:
```
# Plot sentiment indices along time
x = comments[["polarity", "subjectivity"]]
X = pd.DataFrame.rolling(x,window = 50).mean()[::-1]
X.plot(figsize = (20,7))
plt.title("comments polarity/subjectivity")
plt.xlabel("time")
```

```
plt.ylabel("moving avererage")
plt.show()
```

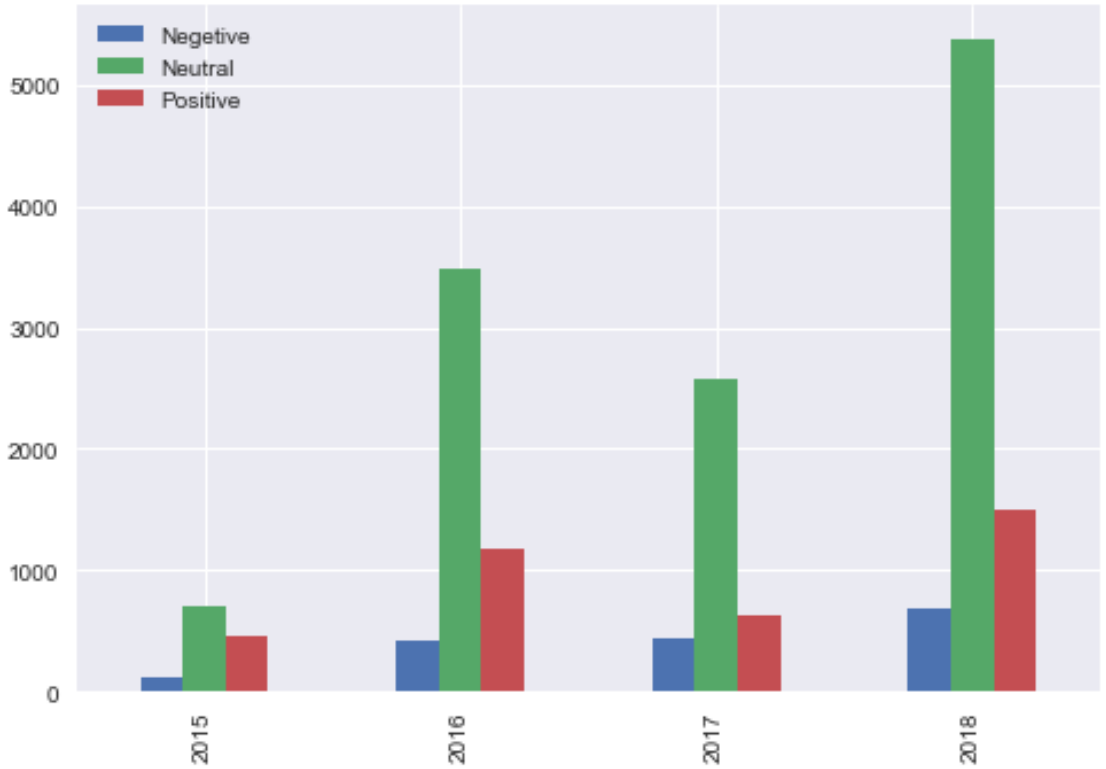


In [10]:
```
#Define sentiment using sentiment indices computed above
def sentiment(index):
    subjectivity, polarity = index[0], index[1]
    if subjectivity > 0.2:
        if polarity > 0.1: return "Positive"
        else: return "Negetive"
    else: return "Neutral"

comments["sentiment"] = comments["sentiment_index"].map(sentiment)
```

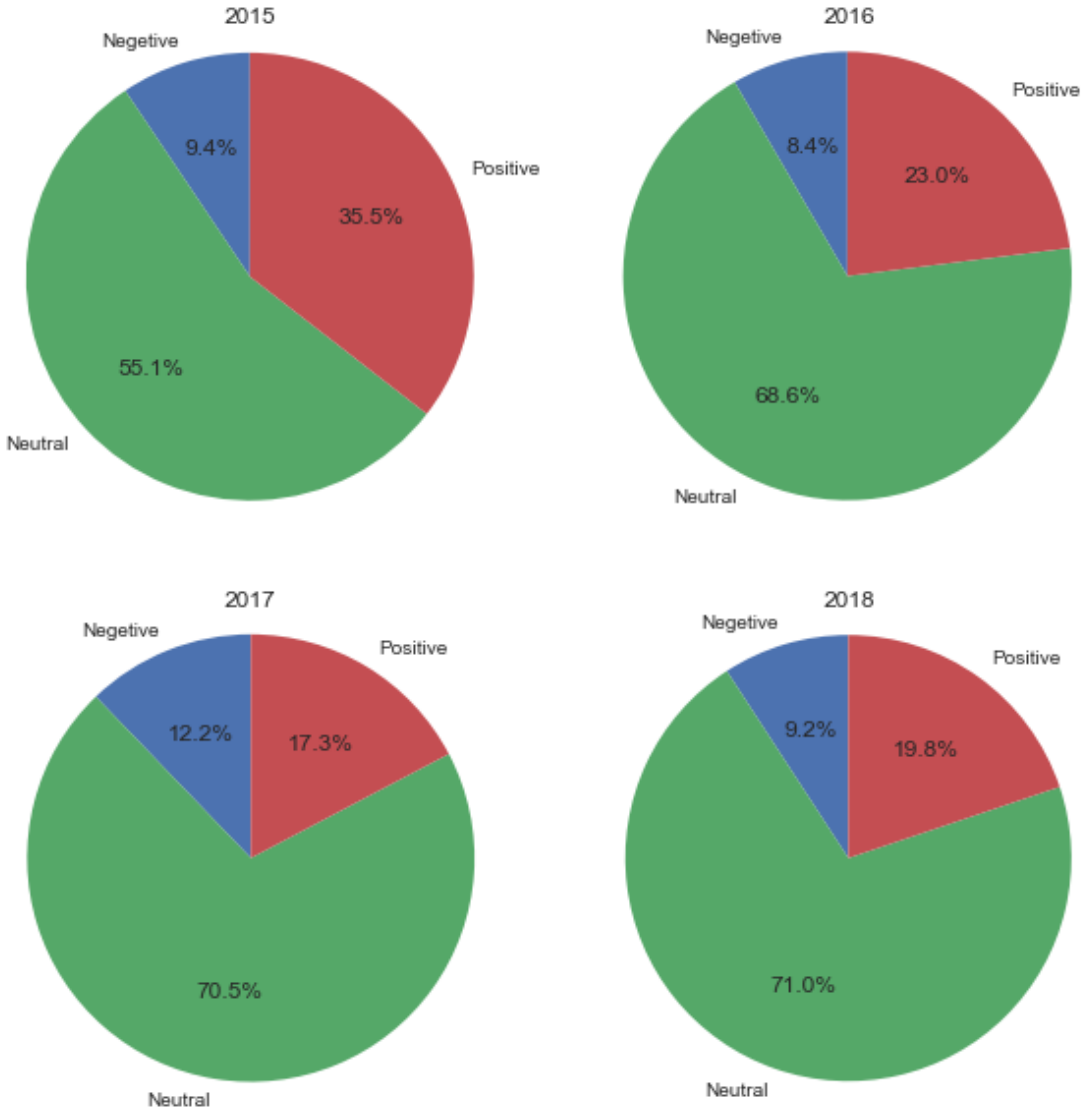
In [11]:
```
# See how sentiments are distributed
sns.countplot(comments['sentiment'],label="Count")
plt.title("Total sentiments distribution")
plt.show()
```




```
In [12]: # Distribution of sentiments across years
         to_year = lambda x : x.strftime('%Y')
         comments["year"] = comments["date"].map(to_year)

         years = ['2015','2016','2017','2018']
         dictio = {}

         for sent in ['Positive','Negetive','Neutral']:
             dictio[sent] = [len(comments["sentiment"][comments["sentiment"] == sent]
                                 [comments["year"] == year]) for year in years]

         df = pd.DataFrame(dictio, index = years)
         df.plot(kind = 'bar')
         plt.show()
```



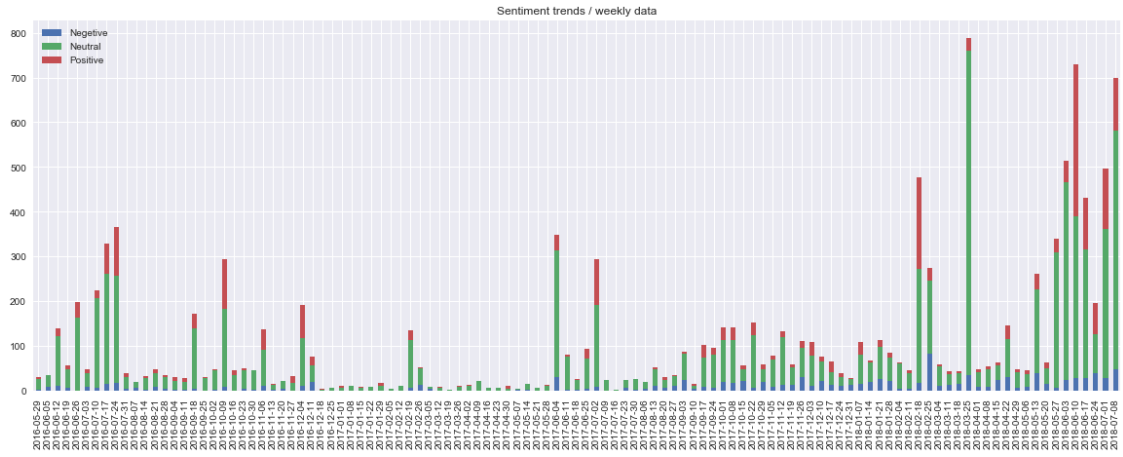
In [13]:
```
# Pie chart of sentiments distribution across years
labels = 'Negetive', 'Neutral', 'Positive'
fig0 = plt.figure(figsize = (10,10))
ax = [None]*len(years)
for i in range(len(years)):
    ax[i] = fig0.add_subplot(2,2,i+1)

for year in years:
    sizes = df.loc[year]
    index = years.index(year)
    ax[index].pie(sizes, labels=labels, autopct='%1.1f%%', startangle = 90)
    ax[index].axis('equal')
    ax[index].set_title(year)

plt.show()
```



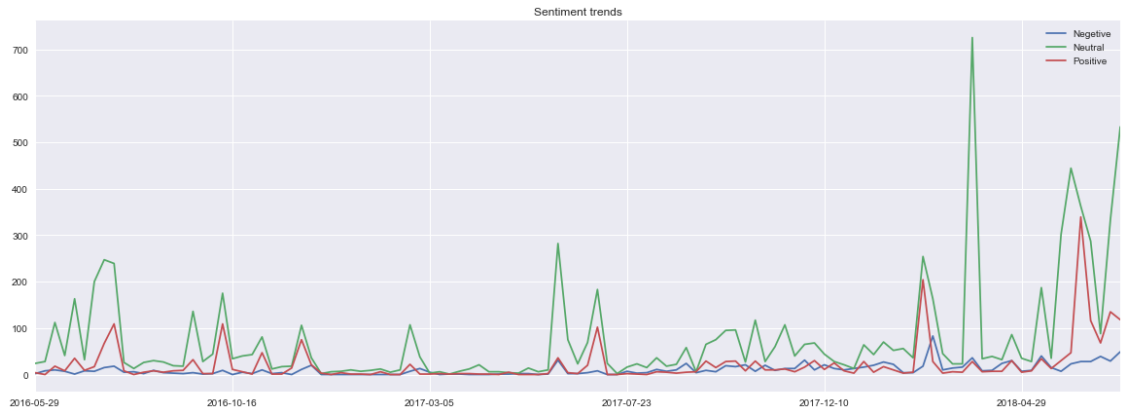
In [14]:
```
# Week-wise distribution of sentiments

start , end = comments["date"].values[-1], comments["date"].values[0]
index = pd.date_range(start,end, freq = 'w')

dict_data = {}
for sentiment in ["Positive", "Negetive","Neutral"]:
    dict_data[sentiment] = [len(comments["sentiment"][comments["sentiment"] == sentimen
          [comments["date"] > index[i]][comments["date"] < index[i+1]])
              for i in range(len(index)-1)]


frame = pd.DataFrame(dict_data, index = index[1:].strftime('%Y-%m-%d'))
```

In [15]:
```
fig1 = plt.figure()
frame.plot(figsize = (20,7), kind = "bar", stacked = "True")
plt.title("Sentiment trends / weekly data")
plt.show()
```

```
<matplotlib.figure.Figure at 0x11db8b5c0>
```

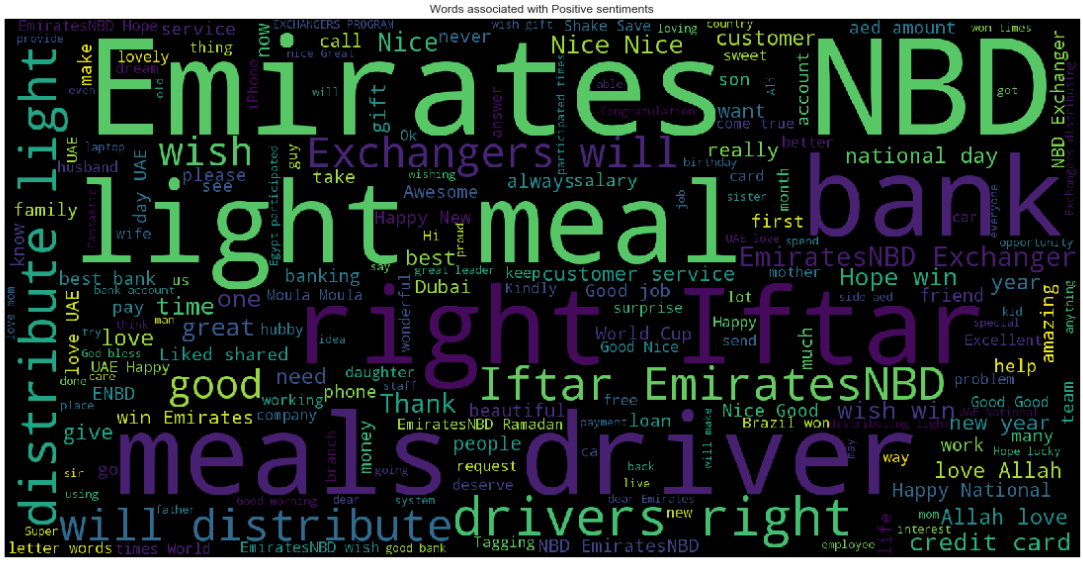


In [16]:
```
# Same plot - continous
frame.plot(figsize = (20,7))
plt.title("Sentiment trends")
plt.show()
```



In [17]:
```
# Collect words and phrases occurring in high sentiment comments
from wordcloud import WordCloud, STOPWORDS
stopwords = set(STOPWORDS)
```

In [18]:
```
# Words and phrases occuring in positive sentiment comments
positive_sentiment_words = " ".join(comments["Clean Text"][comments["sentiment"] == "Po

wordcloud = WordCloud(width=1600, height=800,
                      background_color='black',
                      stopwords = stopwords,
                      max_words=200,
                      max_font_size=200,
                      random_state=42
                     ).generate(positive_sentiment_words)
#print(wordcloud)
fig2 = plt.figure(figsize = (20,10))
plt.imshow(wordcloud)
plt.title("Words associated with Positive sentiments")
plt.axis("off")
plt.show()
```



In [19]:
```
# Words and phrases occurring in negetive sentiment comments
negetive_sentiment_words = " ".join(comments["Clean Text"][comments["sentiment"] == "Ne

wordcloud = WordCloud(width=1600, height=800,
                      background_color='black',
                      stopwords = stopwords,
                      max_words=200,
                      max_font_size=200,
                      random_state=42
                     ).generate(negetive_sentiment_words)
#print(wordcloud)
```

```
fig3 = plt.figure(figsize = (20,10))
plt.imshow(wordcloud)
plt.title("Words associated with Negetive sentiments")
plt.axis("off")
plt.show()
```