IT350 Assignment-3
Data Analytics and Visualization of Live Stream Data

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Google Colab link : https://colab.research.google.com/drive/1ssrd1Abv5feQctUA2x6vTCZciLZ7-E0Z?usp=sharing

Libraries used:

```
[ ] # Libraries
    import pawopy
    from textblob import TextBlob
    from wordcloud import WordCloud
    from bs4 import BeautifulSoup
    import pandas as pd
    import numpy as np
    import re
    import matplotlib.pyplot as plt
    plt.style.use('fivethirtyeight')
```

Q-1. Build a utility to extract and curate data for the analytics tasks.

- **Live Stream Data Source** : Mastodon API
- **Analytics Task** : Sentiment Analysis

Mastodon API Credentials:

```
[ ] # Mastodon API Credentials
    client_key =  "N57uBe12xFDRWuxWhjHQJrJTZtWvBHgD-2PK2eFRsZI"
    client_secret = "qz-44b7faW9i1x64zyxOlm4euEUuzeIy3xHoe5SgA3g"
    access_token =  "fsbe8FHJHra2UICmodb-nzro6273DBVbYxTHRk9mQF4"
```

Creating the authentication object, setting the access token and creating API object while passing in the auth information

```
[ ] # Create the auhentication object
    auth = pawopy.OAuthHandler('https://mastodon.social')

    # Set the access token and access toeken secret
    auth.set_access_token(access_token)

    # Create the API object while passing in the auth information
    api = pawopy.API(auth)
```

Getting array of status by passing trending hashtag name

```
[5] # Hashtag timeline,  return : array of status
    print('Enter any valid Hashtag : ', end = "")
    hashtag = input()
    timeline = api.get('https://mastodon.social/api/v1/timelines/tag/' + hashtag, params={'local':True, 'limit':40})
```

```
Enter any valid Hashtag : visa
```

Creating a dataFrame with a column called posts from array of status

```
[8] #Create a dataFrame with a column called Posts
    df = pd.DataFrame( [post for post in posts], columns = ['Posts'])
    df.head()
```

	Posts
0	https://www.business-standard.com/article/inte...
1	The blocking of Visa and Mastercard only parti...
2	Visa, Mastercard suspend operations in Russia ...
3	https://www.nbcnews.com/news/world/ukraine-rus...
4	https://financialpost.com/pmn/business-pmn/vis...

Clean the text by converting uppercase to lowercase, removing @mentions, special symbols, non-letter character, reply of posts and hyperlink

```
[9] # Clean the text
    # Create a function to clean tweets
    def cleanText(text):
        text = text.lower() # converting upercase to lowercase
        text = re.sub(r'@[A-Za-z0-9]+','',text) # removed @mentions
        text = re.sub(r'#','',text) # Removing the '#' symbol
        text = re.sub(r"[^a-z\s\(\-:\)\\\/\];='#]", '', text) # removing Non-Letter characters
        text = re.sub(r'RT[\s]+','',text) # Removing Reply of posts
        text = re.sub(r'https?:\/\/\S+','',text) # Removed the hyperlink
        return text
```

Applying cleanText function and showing resultant dataframe:

```
[10] # Cleaning the text
     df['Posts'] = df['Posts'].apply(cleanText)

     #show the cleaned text
     df.head()
```

	Posts
0	russian banks switch to unionpay after visa/m...
1	the blocking of visa and mastercard only parti...
2	visa mastercard suspend operations in russia o...
3	zelenskyy biden speak following putins escala...
4	visa mastercard suspend operations in russia ...

Q-2. Performing a data analytics task using data collected as part of question 1.

- We create functions to get the subjectivity and polarity of each post and add them as new columns to our original data frame.
- Then by using the polarity value, we can predict the sentiment of posts as neutral, negative and positive.
- Sentiment can be classified into 3 groups Positive, Negative and Neutral.

```
# Create a function to get the Subjectivity
def getSubjectivity(text):
  return TextBlob(text).sentiment.subjectivity

# Create a function to get the Polarity
def getPolarity(text):
  return TextBlob(text).sentiment.polarity

# Create two new columns
df['Subjectivity'] = df['Posts'].apply(getSubjectivity)
df['Polarity'] = df['Posts'].apply(getPolarity)

#show new dataframe with new columns
df.head()
```

	Posts	Subjectivity	Polarity
0	russian banks switch to unionpay after visa/m...	0.00	0.00
1	the blocking of visa and mastercard only parti...	0.65	-0.05
2	visa mastercard suspend operations in russia o...	0.00	0.00
3	zelenskyy biden speak following putins escala...	0.10	0.00
4	visa mastercard suspend operations in russia ...	0.00	0.00

Creating a function to get the sentiment of each post

```
# Create a function to compute, Neutral, Positive and Negative analysis
def getAnalysis(score):
  if score < 0:
    return 'Negative'
  elif score == 0:
    return 'Neutral'
  else:
    return 'Positive'


df['Analysis'] = df['Polarity'].apply(getAnalysis)
```

```
[14] # Show the dataFrame
     df.head()
```

	Posts	Subjectivity	Polarity	Analysis
0	russian banks switch to unionpay after visa/m...	0.00	0.00	Neutral
1	the blocking of visa and mastercard only parti...	0.65	-0.05	Negative
2	visa mastercard suspend operations in russia o...	0.00	0.00	Neutral
3	zelenskyy biden speak following putins escala...	0.10	0.00	Neutral
4	visa mastercard suspend operations in russia ...	0.00	0.00	Neutral

Plotting the word cloud, which shows the most frequent word with larger font size.

```
12] # Plot the word cloud
    allWords = ' '.join([post for post in df['Posts']])
    wordCloud = WordCloud(width = 500, height = 300, random_state = 21, max_font_size = 119).generate(allWords)
    plt.imshow(wordCloud, interpolation = 'bilinear')
    plt.axis('off')
    plt.show()
```

Q-3. Build a visualization module for data obtained from the task carried out in part 2 so that any changes in the stream are reflected in the visualization.

Printing all positive Posts:

```
[15] # Print all of the Positive Posts
     j = 1
     sortedDF = df.sort_values(by=['Polarity'])
     for i in range(0, sortedDF.shape[0]):
       if sortedDF['Analysis'][i] == 'Positive':
         print(str(j) + ')' + sortedDF['Posts'][i])
         print()
         j = j+1
```

```
1)mastercard visa paypal  others suspend operations in russia as the great cancel putin campaign continues

2) hong kongers apply for visas to settle in the ukaround  hong kongers applied to settle in the uk under a new visa that opens the door t

3)amazon to stop accepting visa credit cards in the united kingdom over high fees amazon visa creditcards amazonuk unitedkingdom

4)wirex open your account today and well give you both some free crypto as a reward best crypto visa card bitcoin use now my referral code

5)new global partnership between visa and crypto comvisa  cryptonews

6)visa and mastercard will investigate the economic links of pornhubvisa mastercard
```

Printing all neutral Posts:

```
# Print the Neutral Posts

j = 1
sortedDF = df.sort_values(by=['Polarity'])
for i in range(0, sortedDF.shape[0]):
  if sortedDF['Analysis'][i] == 'Neutral':
    print(str(j) + ')' + sortedDF['Posts'][i])
    print()
    j = j+1
```

```
1) russian banks switch to unionpay after visa/mastercard cut services

2)visa mastercard suspend operations in russia over its invasion of ukraine visa mastercard russia ukraine russiaukraine ukrainerussiawar

3) zelenskyy biden speak following putins escalation of tensions; visa and mastercard suspend operations in russia

4) visa mastercard suspend operations in russia over ukraine invasion

5) visa mastercard suspend operations in russia

6) mastercard and visa suspend operations in russia

7) visa and mastercard will both suspend operations in russia

8) visa and mastercard suspend operations in russia
```

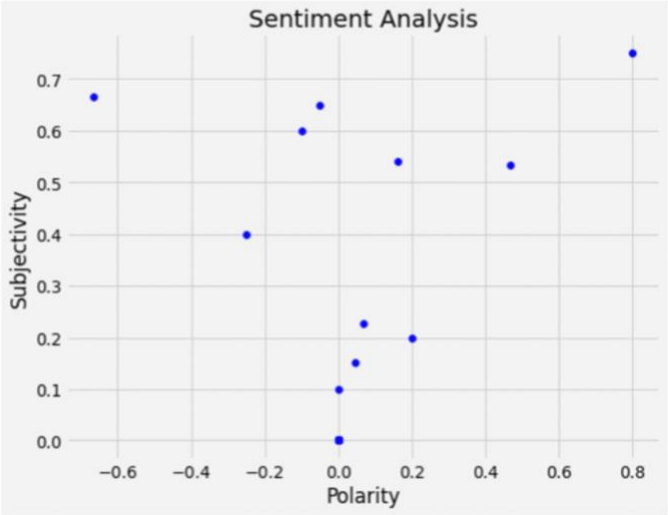
Printing all negative posts:

```
# Print the Negative Posts

j = 1
sortedDF = df.sort_values(by=['Polarity'], ascending='False')
for i in range(0, sortedDF.shape[0]):
  if sortedDF['Analysis'][i] == 'Negative':
    print(str(j) + ')' + sortedDF['Posts'][i])
    print()
    j = j+1
```

```
1)the blocking of visa and mastercard only partially affects transactions in russiamastercard visa

2) visa and mastercard suspend russian operations amid shocking and devastating invasion

3)ethereum ne propose que  tps (transaction par sec) visa   la mise  l'chelle des blockchain est un des dfis en passe d'tre relev par l'industrie  kpmg

4)visa survey says that  of small businesses plan to accept bitcoin in
```

Plotting the polarity and subjectivity:

```
# plot the Polarity and Subjectivity
plt.figure(figsize=(8,6))
for i in range(0,df.shape[0]):
  plt.scatter(df['Polarity'][i], df['Subjectivity'][i], color='Blue')

plt.title('Sentiment Analysis')
plt.xlabel('Polarity')
plt.ylabel('Subjectivity')
plt.show()
```



Getting the percentage of positive, negative and neutral posts

```
[19] # Get the percentage of Positive Posts
     pPosts = df[df.Analysis == 'Positive']
     pPosts = pPosts['Posts']
     round((pPosts.shape[0]/df.shape[0])*100,1)

     15.0

[20] # Get the percentsge of Neutral Posts
     nPosts = df[df.Analysis == 'Neutral']
     nPosts = nPosts['Posts']
     round((nPosts.shape[0]/df.shape[0])*100,1)

     75.0

[21] # Get the percentsge of Negative Posts
     nPosts = df[df.Analysis == 'Negative']
     nPosts = nPosts['Posts']
     round((nPosts.shape[0]/df.shape[0])*100,1)

     10.0
```

Showing and plotting the count of positive, neutral, and negative posts.

```
# Show the value counts
df['Analysis'].value_counts()

# Plot and visualize the counts
plt.title('Sentiment Analysis')
plt.xlabel('Sentiment')
plt.ylabel('Counts')
df['Analysis'].value_counts().plot(kind='bar')
plt.show()
```