NLP_PROJECT

May 22, 2023

[1]:

```
#! pip install networkx
#! pip install openpyxl
```

[2]:

```
# Importing the required Libraries
import numpy as np
import pandas as pd
import nltk
#nltk.download('punkt')
import re
#nltk.download('stopwords')
import matplotlib.pyplot as plt

from nltk.tokenize import sent_tokenize

from nltk.corpus import stopwords

from sklearn.metrics.pairwise import cosine_similarity

import networkx as nx
```

1 Étape 1: Importer les données

[3]:

```
# reading the file
df = pd.read_excel('TASK.xlsx')
```

[4]:

```
df
```

[4]:

```
      TEST DATASET                                         Unnamed: 1
0              NaN                                       Introduction
1              NaN  Acnesol Gel is an antibiotic that fights bacte…
2              NaN  Ambrodil Syrup is used for treating various re…
3              NaN  Augmentin 625 Duo Tablet is a penicillin-type …
4              NaN  Azithral 500 Tablet is an antibiotic used to t…
…            …                                                …
996            NaN  Azapure Tablet belongs to a group of medicines…
997            NaN  Arimidex 1mg Tablet  is used alone or with oth…
998            NaN  Arpimune ME 100mg Capsule is used to prevent y…
```

```
999             NaN  Amlodac CH Tablet is a combination medicine us…
1000            NaN  Angizem CD 120 Capsule ER is used to treat ang…

[1001 rows x 2 columns]
```

[5]:

```
df.columns
```

[5]:

```
Index(['TEST DATASET', 'Unnamed: 1'], dtype='object')
```

2 Étape 2: Prétraitement des données

[6]:

```
df.rename(columns = {'Unnamed: 1' : 'Introduction' }, inplace=True)
# Deleting the first row
df.drop(0)
```

[6]:

```
      TEST DATASET                                       Introduction
1               NaN  Acnesol Gel is an antibiotic that fights bacte…
2               NaN  Ambrodil Syrup is used for treating various re…
3               NaN  Augmentin 625 Duo Tablet is a penicillin-type …
4               NaN  Azithral 500 Tablet is an antibiotic used to t…
5               NaN  Alkasol Oral Solution is a medicine used in th…
…             …                                                …
996             NaN  Azapure Tablet belongs to a group of medicines…
997             NaN  Arimidex 1mg Tablet  is used alone or with oth…
998             NaN  Arpimune ME 100mg Capsule is used to prevent y…
999             NaN  Amlodac CH Tablet is a combination medicine us…
1000            NaN  Angizem CD 120 Capsule ER is used to treat ang…

[1000 rows x 2 columns]
```

3 Étape 3:Word Embeddings

[7]:

```
# Extract word vectors
word_embeddings = {}
file = open('glove.6B.100d.txt', encoding='utf-8')
for line in file:
    values = line.split()
    word = values[0]
    coefs = np.asarray(values[1:], dtype='float32')
    word_embeddings[word] = coefs
file.close()
len(word_embeddings)
```

[7]:

```
400000
```

4 Étape 3: Entraînement du modèle

[8]:

```
# Converting the DataFrame into a dictionary
text_dictionary = {}
for i in range(1,len(df['TEST DATASET'])):
    text_dictionary[i] = df['Introduction'][i]

print(text_dictionary[1])
```

```
Acnesol Gel is an antibiotic that fights bacteria. It is used to treat acne,
which appears as spots or pimples on your face, chest or back. This medicine
works by attacking the bacteria that cause these pimples.Acnesol Gel is only
meant for external use and should be used as advised by your doctor. You should
normally wash and dry the affected area before applying a thin layer of the
medicine. It should not be applied to broken or damaged skin. Avoid any contact
with your eyes, nose, or mouth. Rinse it off with water if you accidentally get
it in these areas. It may take several weeks for your symptoms to improve, but
you should keep using this medicine regularly. Do not stop using it as soon as
your acne starts to get better. Ask your doctor when you should stop
treatment.Common side effects like minor itching, burning, or redness of the
skin and oily skin may be seen in some people. These are usually temporary and
resolve on their own. Consult your doctor if they bother you or do not go
away.It is a safe medicine, but you should inform your doctor if you have any
problems with your bowels (intestines). Also, inform the doctor if you have ever
had bloody diarrhea caused by taking antibiotics or if you are using any other
medicines to treat skin conditions. Consult your doctor about using this
medicine if you are pregnant or breastfeeding.
```

[9]:

```
# function to remove stopwords
def remove_stopwords(sen):
    stop_words = stopwords.words('english')

    sen_new = " ".join([i for i in sen if i not in stop_words])
    return sen_new
```

[10]:

```
# function to make vectors out of the sentences
def sentence_vector_func (sentences_cleaned) :
    sentence_vector = []
    for i in sentences_cleaned:
        if len(i) != 0:
            v = sum([word_embeddings.get(w, np.zeros((100,))) for w in i.
 ↪split()])/(len(i.split())+0.001)
        else:
            v = np.zeros((100,))
        sentence_vector.append(v)

    return (sentence_vector)
```

5 Étape 4:Text Summarization Algorithm

[11]:
```
# function to get the summary of the articles

def summary_text (test_text, n = 5):
    sentences = []

    # tokenising the text
    sentences.append(sent_tokenize(test_text))

    sentences = [y for x in sentences for y in x] # flatten list


    # remove punctuations, numbers and special characters
    clean_sentences = pd.Series(sentences).str.replace("[^a-z A-Z 0-9]", " ")

    # make alphabets lowercase
    clean_sentences = [s.lower() for s in clean_sentences]



    # remove stopwords from the sentences
    clean_sentences = [remove_stopwords(r.split()) for r in clean_sentences]


    sentence_vectors = sentence_vector_func(clean_sentences)

    # similarity matrix
    sim_mat = np.zeros([len(sentences), len(sentences)])

    # Finding the similarities between the sentences
    for i in range(len(sentences)):
        for j in range(len(sentences)):
            if i != j:
                sim_mat[i][j] = cosine_similarity(sentence_vectors[i].
 ↪reshape(1,100), sentence_vectors[j].reshape(1,100))[0,0]


    nx_graph = nx.from_numpy_array(sim_mat)
    scores = nx.pagerank(nx_graph)

    ranked_sentences = sorted(((scores[i],s) for i,s in enumerate(sentences)))
    # Extract sentences as the summary
    summarised_string = ''
    for i in range(n):

        try:
            summarised_string = summarised_string + str(ranked_sentences[i][1])
        except IndexError:
            print ("Summary Not Available")

    return (summarised_string)
```

[12]:

```
print("Kindly let me know in how many sentences you want the summary - ")
x = int(input())

summary_dictionary = {}

for key in text_dictionary:

    para = text_dictionary[key]
    print("Summary of the article - ",key)
    summary = summary_text(para,x)
    summary_dictionary[key] = summary

    print(summary)
    print('='*120)

    if key >= 4:  # Stop after the first 5 key-value pairs
        break

print ("*"*40,"The process has been completed successfully","*"*40)
```

```
Kindly let me know in how many sentences you want the summary -

 3

Summary of the article -  1
Acnesol Gel is an antibiotic that fights bacteria.These are usually temporary
and resolve on their own.Consult your doctor about using this medicine if you
are pregnant or breastfeeding.
================================================================================
========================================
Summary of the article -  2
Ambrodil Syrup is used for treating various respiratory tract disorders
associated with excessive mucus.It works by thinning and loosens mucus in the
nose, windpipe and lungs and make it easier to cough out.Ambrodil Syrup should
be taken with food.For better results, it is suggested to take it at the same
time every day.
================================================================================
========================================
Summary of the article -  3
It is used to treat infections of the lungs (e.g., pneumonia), ear, nasal sinus,
urinary tract, skin and soft tissue.You should take it regularly at evenly
spaced intervals as per the schedule prescribed by your doctor.Augmentin 625 Duo
Tablet is a penicillin-type of antibiotic that helps your body fight infections
```

```
caused by bacteria.
================================================================================
========================================
Summary of the article -  4

C:\Users\megdiche leila\AppData\Local\Temp\ipykernel_2564\3308548730.py:13:
FutureWarning: The default value of regex will change from True to False in a
future version.
  clean_sentences = pd.Series(sentences).str.replace("[^a-z A-Z 0-9]", " ")
C:\Users\megdiche leila\AppData\Local\Temp\ipykernel_2564\3308548730.py:13:
FutureWarning: The default value of regex will change from True to False in a
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C:\Users\megdiche leila\AppData\Local\Temp\ipykernel_2564\3308548730.py:13:
FutureWarning: The default value of regex will change from True to False in a
future version.
  clean_sentences = pd.Series(sentences).str.replace("[^a-z A-Z 0-9]", " ")

These are usually temporary and subside with the completion of treatment.It
should be used regularly at evenly spaced time intervals as prescribed by your
doctor.Pregnant or breastfeeding women should consult their doctor before using
this medicine.
================================================================================
========================================
**************************************** The process has been completed
successfully ****************************************
```

[13]:

```
summary_table = pd.DataFrame(list(summary_dictionary.items()),columns = ['TEST␣
  ↪DATASET','Summary'])
```

[14]:

```
data_table = pd.DataFrame(list(text_dictionary.items()),columns = ['TEST␣
  ↪DATASET','Introduction'])
```

[15]:

```
# Combining the findings into the table
result  = pd.concat([data_table , summary_table['Summary']], axis = 1 , sort =␣
  ↪False)
result
```

[15]:

```
     TEST DATASET                                       Introduction  \
0               1  Acnesol Gel is an antibiotic that fights bacte…
1               2  Ambrodil Syrup is used for treating various re…
2               3  Augmentin 625 Duo Tablet is a penicillin-type …
3               4  Azithral 500 Tablet is an antibiotic used to t…
4               5  Alkasol Oral Solution is a medicine used in th…
```

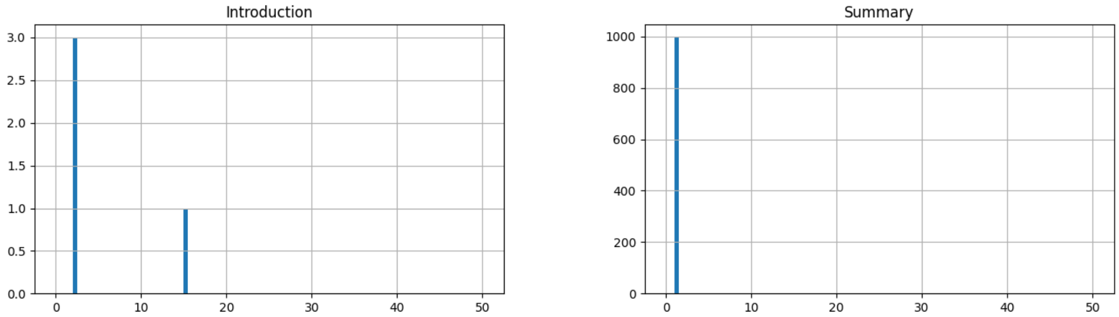
```
..            …                                                …
995           996  Azapure Tablet belongs to a group of medicines…
996           997  Arimidex 1mg Tablet  is used alone or with oth…
997           998  Arpimune ME 100mg Capsule is used to prevent y…
998           999  Amlodac CH Tablet is a combination medicine us…
999          1000  Angizem CD 120 Capsule ER is used to treat ang…

                                               Summary
0    Acnesol Gel is an antibiotic that fights bacte…
1    Ambrodil Syrup is used for treating various re…
2    It is used to treat infections of the lungs (e…
3    These are usually temporary and subside with t…
4                                                 NaN
..                                                …
995                                               NaN
996                                               NaN
997                                               NaN
998                                               NaN
999                                               NaN

[1000 rows x 3 columns]
```

[16]:
```
text_count = [len(str(sentence).split()) for sentence in result.Introduction]
summary_count = [len(str(sentence).split()) for sentence in result.Summary]

result_df = pd.DataFrame({'Introduction': text_count, 'Summary': summary_count})
result_df.hist(bins=100, figsize=(16, 4), range=[0, 50])
plt.show()
```



[17]:
```
# Saving it to a file
result.to_csv("Summary_File.csv")
```

6 Étape 5: User interface

[18]:

```
import tkinter as tk
from tkinter import scrolledtext
from tkinter import messagebox
```

[19]:

```
def summarize_text():
    input_text = input_text_area.get("2.0", tk.END).strip()

    if input_text:
        summary = summary_text(input_text)
        summary_output_area.configure(state="normal")
        summary_output_area.delete("2.0", tk.END)
        summary_output_area.insert(tk.END, summary)
        summary_output_area.configure(state="disabled")
    else:
        messagebox.showwarning("Warning", "Please enter some text.")
```

[ ]:

```
root = tk.Tk()
root.title("Text Summarization")
root.geometry("1000x600")

input_label = tk.Label(root, text="Input Text:")
input_label.pack()

input_text_area = scrolledtext.ScrolledText(root, height=8)
input_text_area.pack()

summary_label = tk.Label(root, text="Summary:")
summary_label.pack()

summary_output_area = scrolledtext.ScrolledText(root, height=8,␣
 ↪state="disabled")
summary_output_area.pack()

summarize_button = tk.Button(root, text="Summarize", command=summarize_text)
summarize_button.pack()

root.mainloop()
```

[ ]:

```
```