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Tarea 2: lematización y post tagging.

```
 %matplotlib inline
import nltk
import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
from nltk.probability import FreqDist

# librería para realizar peticiones web
import requests

# librería que nos permite extrar texto de un sitio web y convertirlo a string
from bs4 import BeautifulSoup

# librería que contiene las palabras auxiliares
from nltk.corpus import stopwords

# librería para realizar la lematización de palabras
from nltk.stem import WordNetLemmatizer
```

obtención del texto y limpieza del mismo

```
 # tema que se buscará
tema = 'Natural language processing'

# enlace para acceder al contenido de la Wikipedia
response = requests.get(f'http://en.wikipedia.org/wiki/{tema}')

# transformar el sitio web a texto plano
soup = BeautifulSoup(response.text)

# obtener el texto por párrafos
parrafos = soup.find_all('p')

# obtener solo el primer parrafo
texto = parrafos[0].text

# mostrar el texto con el que trabajaremos
print(texto)
```

```
Natural language processing (NLP) is a subfield of linguistics, computer science, and artificial intelligence concerned with the interactions between
computers and human language, in particular how to program computers to process and analyze large amounts of natural language data.  The result is a computer
 capable of "understanding" the contents of documents, including the contextual nuances of the language within them. The technology can then accurately
extract information and insights contained in the documents as well as categorize and organize the documents themselves.
```

```
 # se crea una variable que contenga todas las palabras auxiliares
palabras_auxiliares = set(stopwords.words('english'))


# mostramos las palabras auxiliares
print(palabras_auxiliares)
```

```
{'down', 'my', 'these', 'isn', "needn't", 'between', 'then', 'her', 'into', 'more', 'same', 'wouldn', 'up', 'she', 'haven', 'his', 'he', 'they', 'theirs',
'and', 'will', "aren't", 'until', 'have', 'any', 't', 'am', 'their', 'him', 'from', 'above', "isn't", 'ma', 'has', "hadn't", 'were', 'does', "hasn't", 'just',
'yourselves', 'of', "wasn't", "mustn't", 'this', 'i', 'not', 'while', 'itself', "mightn't", 'because', "you're", 'before', "should've", "weren't", 'all',
"don't", "you'll", "shouldn't", 've', 'me', "won't", 'what', 'where', 'why', "it's", 'at', 'through', 'shouldn', 'under', 'didn', 'hasn', 'own', 'as', 'mightn',
 'yours', 'll', "you'd", 'so', 'yourself', 'by', 'in', 'is', 'now', 'our', "couldn't", 'on', 'for', 'after', "wouldn't", 'that', 'no', 'being', 'too', 'doesn',
'you', 'off', 'there', 'than', 'o', 'nor', 'needn', 'your', 'an', 's', 'or', 'ain', 'during', 'a', 'over', 'once', 'been', 'ourselves', 'do', 'its', 'out',
'such', 'can', "that'll", 'about', 'hers', 'themselves', 'shan', 'few', 'we', 'whom', 'very', 'mustn', 'hadn', 'be', 'to', 'only', 'but', "haven't", 'd',
'doing', 'those', 'ours', 'below', 'them', 'are', 'with', 'did', 'it', 'should', 'wasn', 'here', 'if', 'further', "shan't", 'against', 'how', 'couldn', 'm',
"you've", 'don', 'which', "doesn't", 'again', "she's", 'himself', 'both', 'myself', 'the', 'herself', 'who', 're', 'aren', 'was', 'won', "didn't", 'weren', 'y',
 'most', 'other', 'had', 'some', 'having', 'when', 'each'}
 #  \w+ acepta cualquier caracter que se encuentre en el rango de [a-zA-Z0-9_]
# aplicamos una expresión regular que haga
texto_en_tokens = nltk.regexp_tokenize(texto, '\w+')

# transformar palabras a minúsculas para que hagan match con las palabras auxiliares
texto_en_tokens = np.array([palabra.lower() for palabra in texto_en_tokens])

# quitamos las palabras auxiliares mediante un bucle que las busque en el texto
texto_en_tokens = np.array([palabra for palabra in texto_en_tokens if not palabra in palabras_auxiliares])

print(f'Longitud del texto en tokens: {len(texto_en_tokens)}')
```

```
 Longitud del texto en tokens: 47
```

lematización

```
 # guardamos en una variable el método WordNetLemmatizer
lemmatizer = WordNetLemmatizer()

# arreglo para guardar los tokens ya pasados por el metodo lemmatize
tokens_lematizados = np.array([lemmatizer.lemmatize(token) for token in texto_en_tokens])
```

POS tagging

```
 # aplicar pos taging a los tokens
pos_tags = nltk.pos_tag(texto_en_tokens)
```

resultados

```
 # crear un dataframe para guardar nuestros resultados
dataframe_lematizacion = pd.DataFrame()

# crear una columna para cada uno con su respectivo resultado
dataframe_lematizacion['token'] = texto_en_tokens
dataframe_lematizacion['lematizacion'] = tokens_lematizados
dataframe_lematizacion['pos_tagging'] = pos_tags
dataframe_lematizacion['pos_tags'] = dataframe_lematizacion['pos_tagging'].apply(lambda x: x[1])

dataframe_lematizacion
```

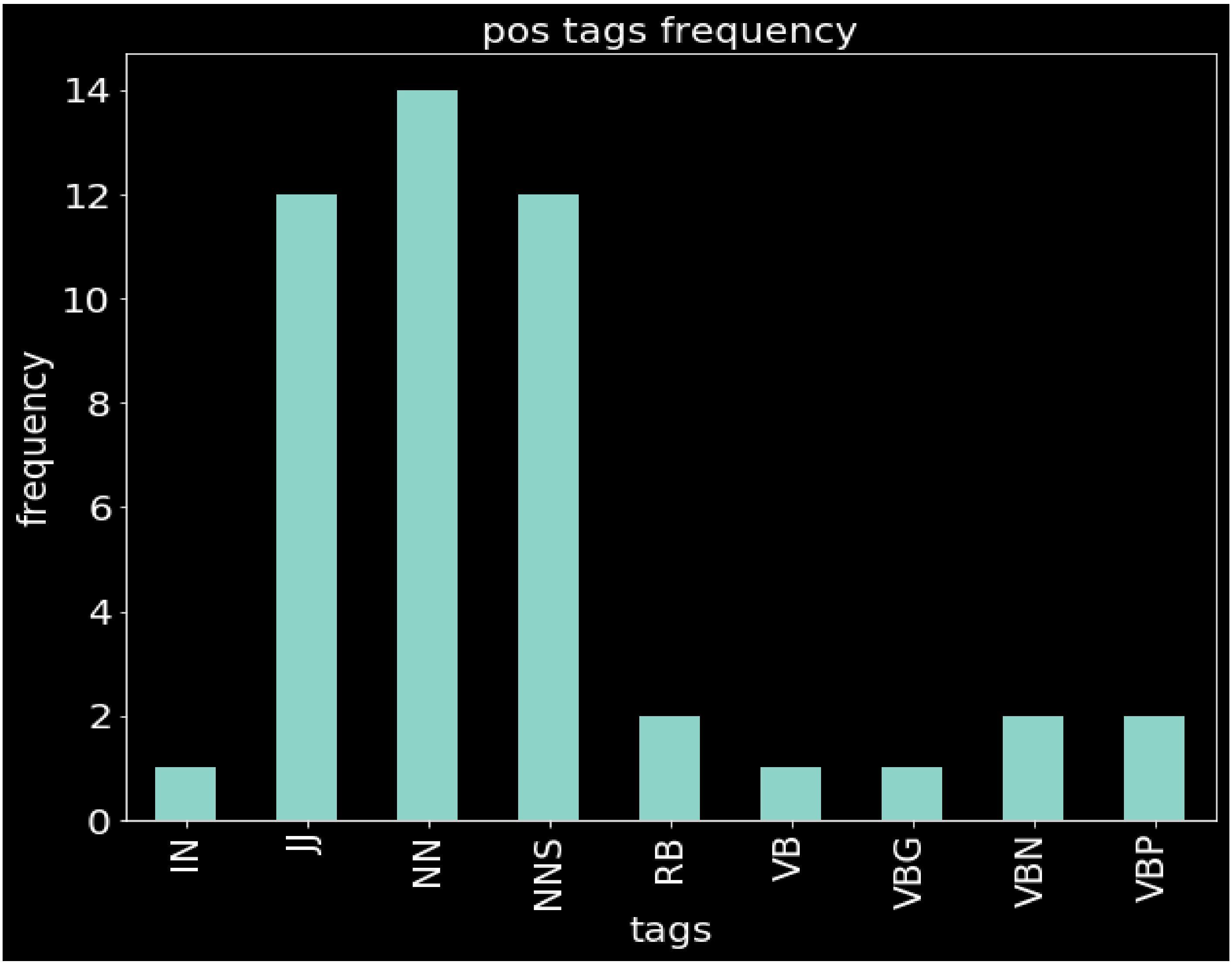
	token	lematizacion	pos_tagging	pos_tags
0	natural	natural	(natural, JJ)	JJ
1	language	language	(language, NN)	NN
2	processing	processing	(processing, NN)	NN
3	nlp	nlp	(nlp, JJ)	JJ
4	subfield	subfield	(subfield, NN)	NN
5	linguistics	linguistics	(linguistics, NNS)	NNS
6	computer	computer	(computer, NN)	NN
7	science	science	(science, NN)	NN
8	artificial	artificial	(artificial, JJ)	JJ

	token	lematizacion	pos_tagging	pos_tags
9	intelligence	intelligence	(intelligence, NN)	NN
10	concerned	concerned	(concerned, VBN)	VBN
11	interactions	interaction	(interactions, NNS)	NNS
12	computers	computer	(computers, NNS)	NNS
13	human	human	(human, JJ)	JJ
14	language	language	(language, NN)	NN
15	particular	particular	(particular, JJ)	JJ
16	program	program	(program, NN)	NN
17	computers	computer	(computers, NNS)	NNS
18	process	process	(process, VBP)	VBP
19	analyze	analyze	(analyze, JJ)	JJ
20	large	large	(large, JJ)	JJ
21	amounts	amount	(amounts, NNS)	NNS
22	natural	natural	(natural, JJ)	JJ
23	language	language	(language, NN)	NN
24	data	data	(data, NNS)	NNS
25	result	result	(result, VBP)	VBP
26	computer	computer	(computer, NN)	NN
27	capable	capable	(capable, JJ)	JJ
28	understanding	understanding	(understanding, JJ)	JJ
29	contents	content	(contents, NNS)	NNS
30	documents	document	(documents, NNS)	NNS
31	including	including	(including, VBG)	VBG
32	contextual	contextual	(contextual, JJ)	JJ
33	nuances	nuance	(nuances, NNS)	NNS
34	language	language	(language, NN)	NN
35	within	within	(within, IN)	IN
36	technology	technology	(technology, NN)	NN
37	accurately	accurately	(accurately, RB)	RB
38	extract	extract	(extract, JJ)	JJ
39	information	information	(information, NN)	NN
40	insights	insight	(insights, NNS)	NNS

	token	lematizacion	pos_tagging	pos_tags
41	contained	contained	(contained, VBN)	VBN
42	documents	document	(documents, NNS)	NNS
43	well	well	(well, RB)	RB
44	categorize	categorize	(categorize, VB)	VB
45	organize	organize	(organize, NN)	NN
46	documents	document	(documents, NNS)	NNS

```
 # agrupar por post_tags para poder graficar
tag_counts = dataframe_lematizacion.groupby('pos_tags')['token'].count()
```

```
 # graficar los resultados
plt.style.use('dark_background')
plt.figure(figsize=(10,8)) # tamaño de la figura
tag_counts.plot(kind='bar', fontsize=20) # qué se graficará y tipo de gráfica
plt.title('pos tags frequency', fontsize=20) # título del gráfico
plt.xlabel('tags', fontsize=20) # etiqueta del eje x
plt.ylabel('frequency', fontsize=20) # etiqueta del eje y
```


pos tags frequency
frequency
IN
JJ
NN
NNS
RB
VB
VBG
VBN
VBP
tags