lista2

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1 SWI - Lista zadań 2

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1.1 1. Opisz krótko technologię/język, w której zadania są zaimplementowane.

- Python 3.10.7
- Jupyter Notebook
- Pandas
- NLTK
- matplotlib

[ ]:
```
import pandas as pd
import nltk
import re
```

1.1.1 2. Wybierz zbiór 10 dokumentów (tekstów), każdy o wielkości powyżej 700 słów np. artykułów naukowych

Wybrano Agendy dostępne tutaj:
https://joint-research-centre.ec.europa.eu/language-technology-resources/dcep-digital-corpus-european-parliament_en

[ ]:
```
DOCUMENTS = [
  "data/33695617__AGENDA__20120417__EN.txt", # 1
  "data/33522030__AGENDA__20120328__EN.txt", # 2
  "data/33341201__AGENDA__20120312__EN.txt", # 3
  "data/33119249__AGENDA__20120213__EN.txt", # 4
  "data/33005308__AGENDA__20120201__EN.txt", # 5
  "data/32858414__AGENDA__20120116__EN.txt", # 6
  "data/32453686__AGENDA__20111212__EN.txt", # 7
  "data/32262848__AGENDA__20111130__EN.txt", # 8
  "data/32089495__AGENDA__20111114__EN.txt", # 9
  "data/31793410__AGENDA__20111024__EN.txt", # 10
]
```

1.1.2 3. Tabela wyrazów

[ ]:
```
stemmer = nltk.stem.SnowballStemmer(language="english")

out = []
for doc in DOCUMENTS:
  with open(doc) as f:
    words = re.findall(r"[a-zA-Z]+", f.read())
    unique = set(words)
    stemmed = set(stemmer.stem(word) for word in unique)
    out.append([doc, len(words), len(unique), len(stemmed)])

pd.DataFrame(data=out, columns=["Nazwa dokumentu", "Liczba słów", "Liczba␣
 ↪różnych słów", "Liczba różnych termów"])
```

[ ]:

	Nazwa dokumentu	Liczba słów	Liczba różnych słów	\
0	data/33695617__AGENDA__20120417__EN.txt	2303	439	
1	data/33522030__AGENDA__20120328__EN.txt	2592	416	
2	data/33341201__AGENDA__20120312__EN.txt	4763	501	
3	data/33119249__AGENDA__20120213__EN.txt	6504	697	
4	data/33005308__AGENDA__20120201__EN.txt	2337	350	
5	data/32858414__AGENDA__20120116__EN.txt	2491	387	
6	data/32453686__AGENDA__20111212__EN.txt	10361	850	
7	data/32262848__AGENDA__20111130__EN.txt	3321	452	
8	data/32089495__AGENDA__20111114__EN.txt	7944	865	
9	data/31793410__AGENDA__20111024__EN.txt	6357	732	

	Liczba różnych termów
0	394
1	365
2	428
3	584
4	294
5	327
6	733
7	390
8	740
9	603

1.1.3 4. Tabela wystąpień termów

[ ]:
```
def term_count(doc: str) -> tuple[pd.Series, pd.DataFrame]:
  with open(doc) as f:
    words = re.findall(r"[a-zA-Z]+", f.read())
  series = pd.value_counts([stemmer.stem(word) for word in words], sort=True)
  return series, series.to_frame(name=doc)
```

Dokument 1

[ ]:
```
s, df = term_count(DOCUMENTS[0])
df
```

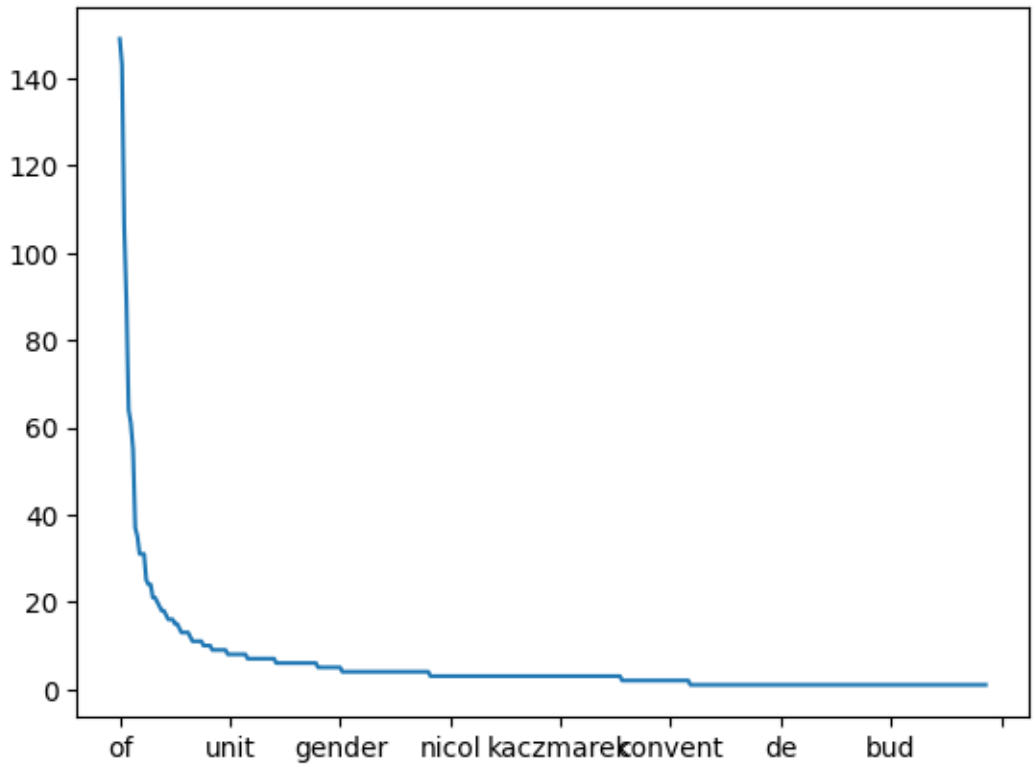
[ ]:

	data/33695617__AGENDA__20120417__EN.txt
of	149
the	143
on	106
and	89
committe	64
…	…
schmidt	1
market	1
consum	1
protect	1
e	1

[394 rows x 1 columns]

[ ]:
```
s.plot(kind="line")
```

[ ]: <Axes: >



Dokument 2

[ ]:
```
s, df = term_count(DOCUMENTS[1])
df
```

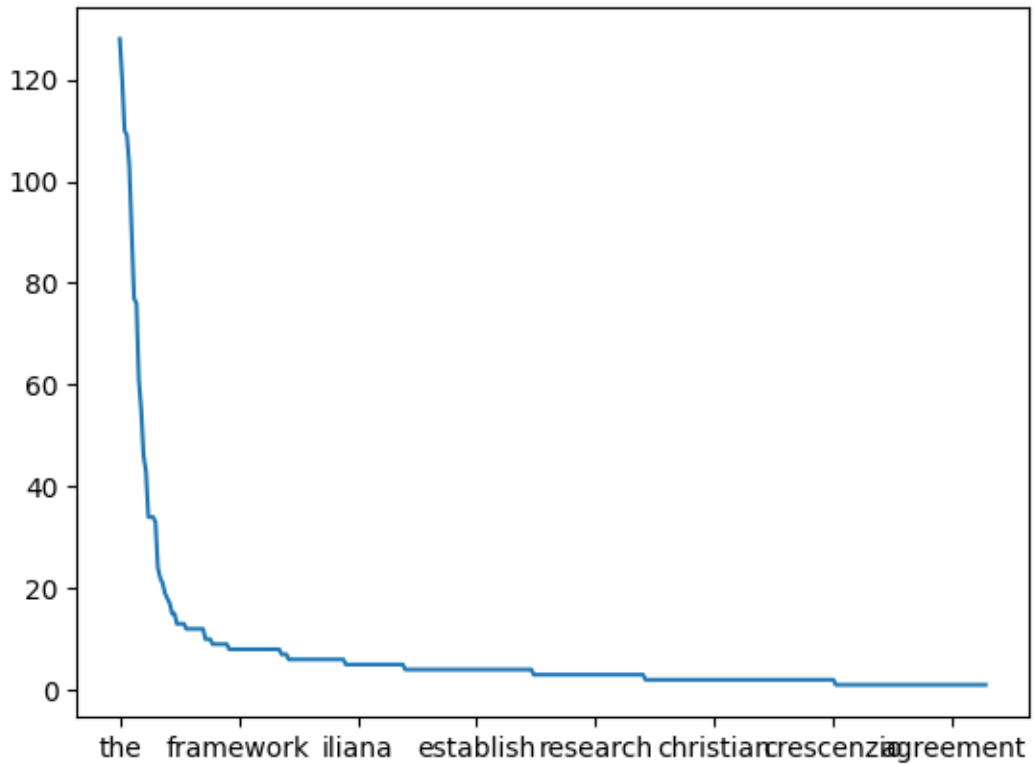
[ ]:

	data/33522030__AGENDA__20120328__EN.txt
the	128
on	120
for	110
of	109
and	103
…	…
mean	1
within	1
individu	1
eighteenth	1
brussel	1

[365 rows x 1 columns]

[ ]:
```
s.plot(kind="line")
```

[ ]: <Axes: >



Dokument 3

[ ]:
```
s, df = term_count(DOCUMENTS[2])
df
```

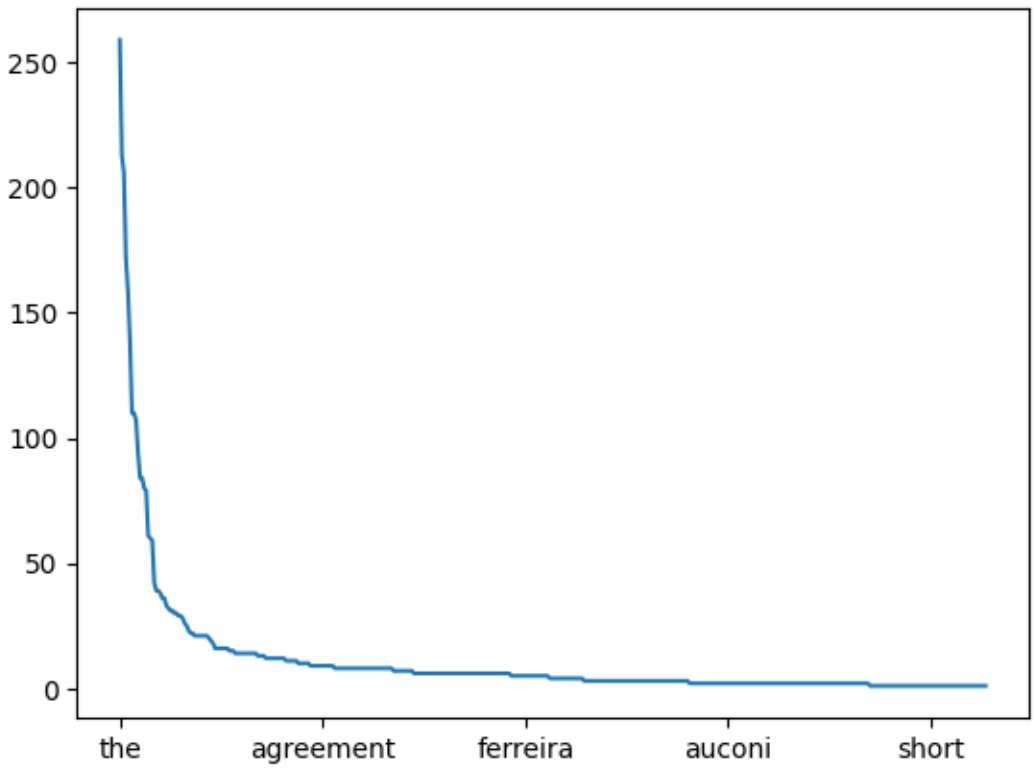
[ ]:

	data/33341201__AGENDA__20120312__EN.txt
the	259
of	213
and	206
for	172
on	159
…	…
bieta	1
el	1
econ	1
imm	1
each	1

[428 rows x 1 columns]

[ ]:
```
s.plot(kind="line")
```

[ ]: <Axes: >



Dokument 4

[ ]:
```
s, df = term_count(DOCUMENTS[3])
df
```

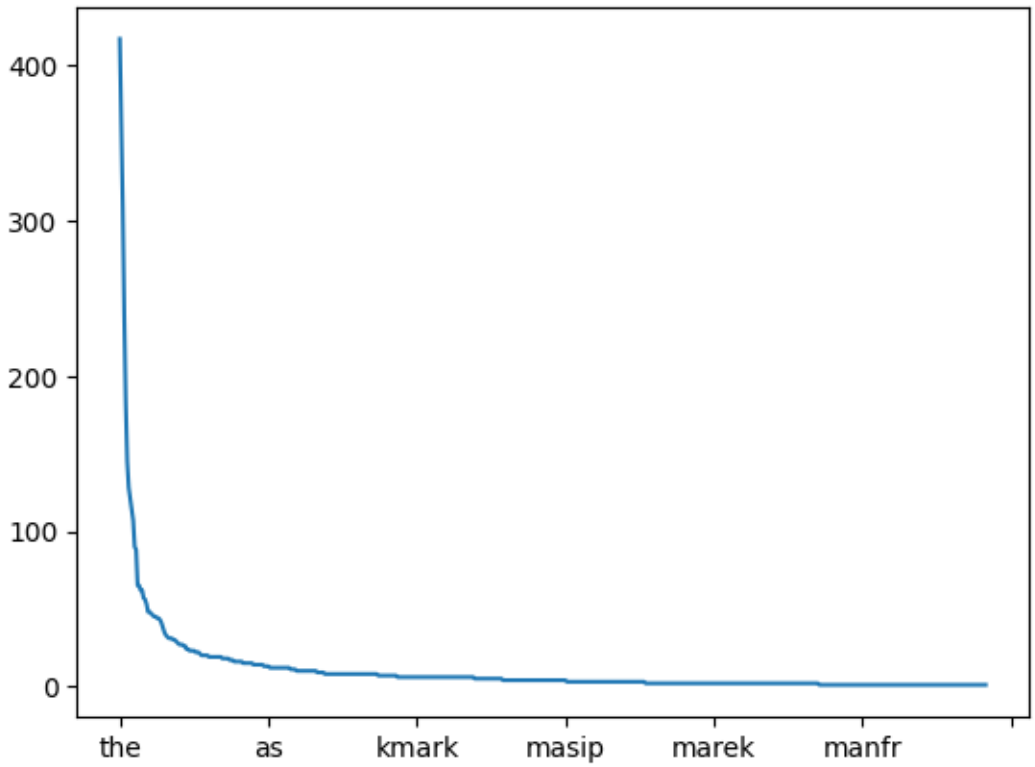
[ ]:

	data/33119249__AGENDA__20120213__EN.txt
the	417
of	362
and	308
on	239
for	183
…	…
assist	1
exercis	1
it	1
execut	1
each	1

[584 rows x 1 columns]

[ ]:
```
s.plot(kind="line")
```

[ ]: <Axes: >



Dokument 5

[ ]:
```
s, df = term_count(DOCUMENTS[4])
df
```

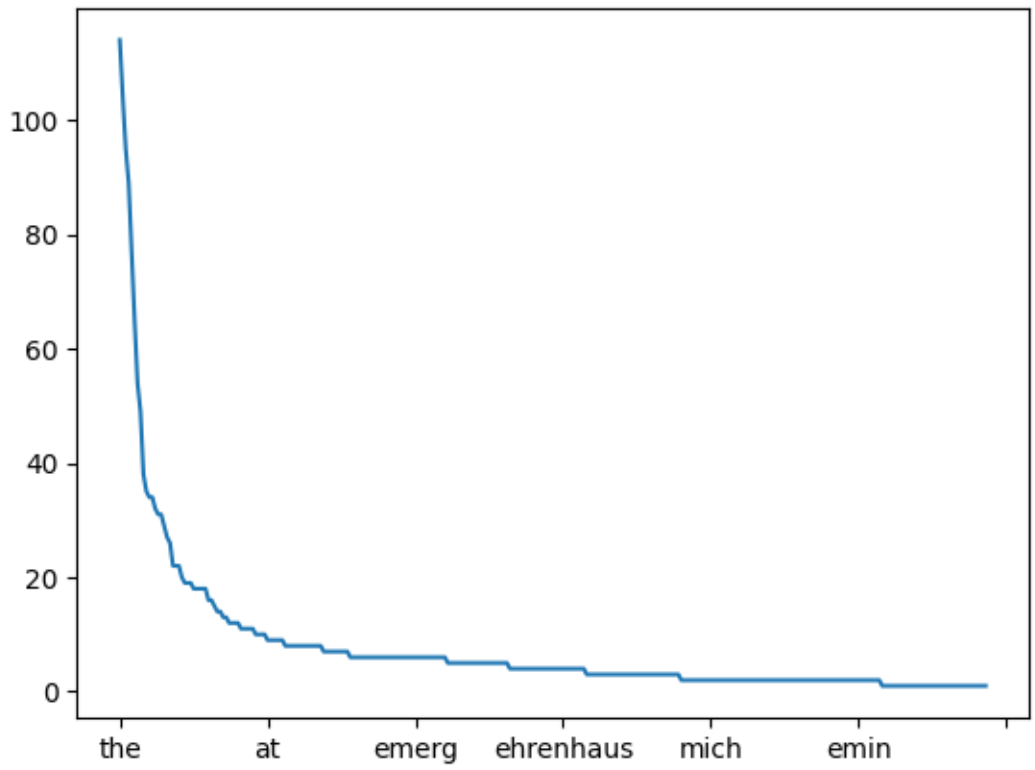
[ ]:

	data/33005308__AGENDA__20120201__EN.txt
the	114
on	104
of	95
and	89
committe	77
…	…
minut	1
speech	1
opinion	1
explan	1
decemb	1

[294 rows x 1 columns]

[ ]:
```
s.plot(kind="line")
```

[ ]: <Axes: >



Dokument 6

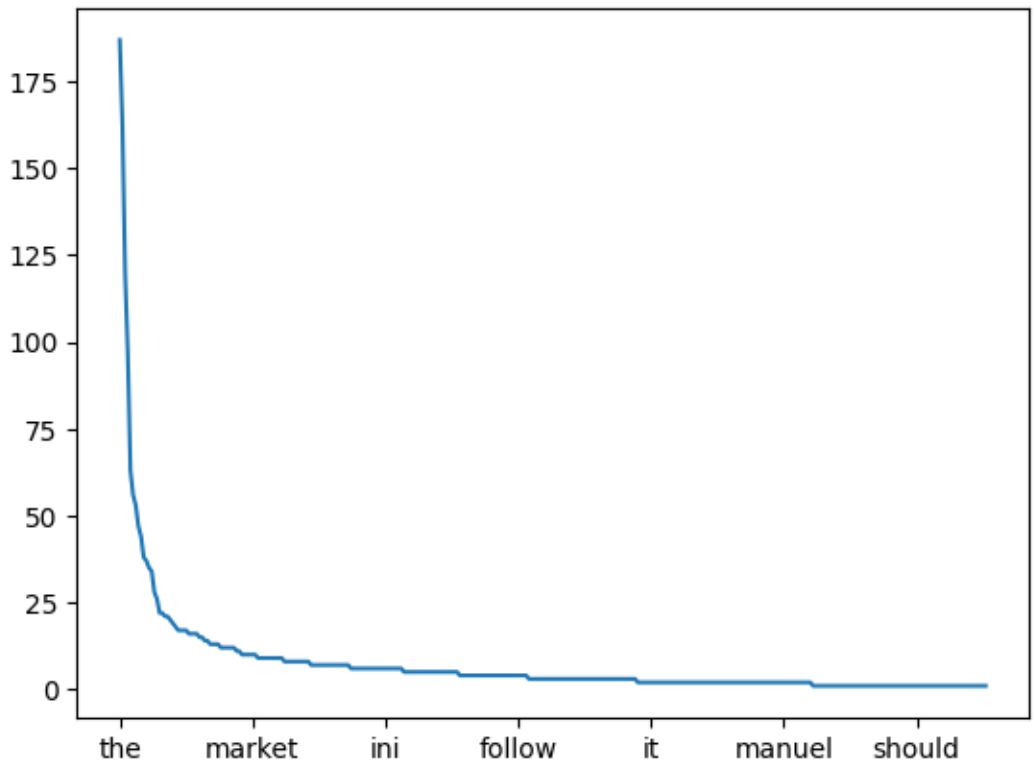
```
[ ]: s, df = term_count(DOCUMENTS[5])
     df
```

```
[ ]:         data/32858414__AGENDA__20120116__EN.txt
     the                                         187
     of                                          162
     and                                         120
     on                                           97
     a                                            63
     …                                             …
     part                                          1
     next                                          1
     held                                          1
     will                                          1
     altern                                        1

     [327 rows x 1 columns]
```

```
[ ]: s.plot(kind="line")
```

```
[ ]: <Axes: >
```



Dokument 7

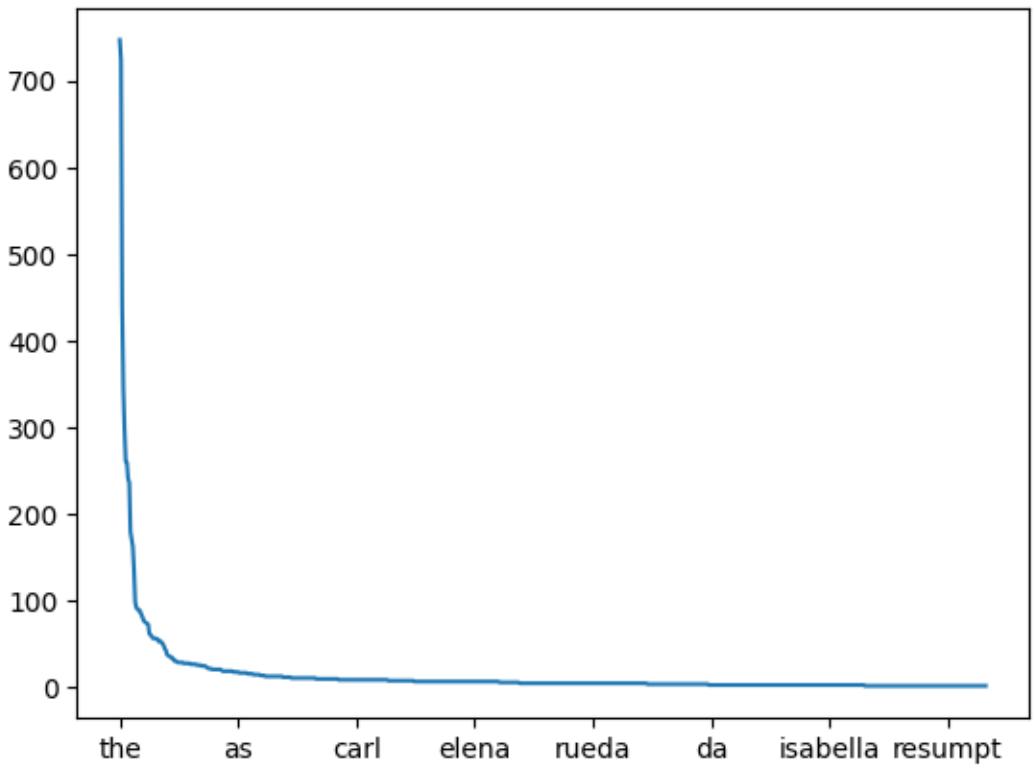
```
[ ]: s, df = term_count(DOCUMENTS[6])
     df
```

```
[ ]:          data/32453686__AGENDA__20111212__EN.txt
     the                                          747
     of                                           724
     and                                          439
     on                                           344
     european                                     296
     …                                            …
     an                                             1
     agri                                           1
     eec                                            1
     juri                                           1
     each                                           1

     [733 rows x 1 columns]
```

```
[ ]: s.plot(kind="line")
```

```
[ ]: <Axes: >
```



Dokument 8

[ ]:
```
s, df = term_count(DOCUMENTS[7])
df
```

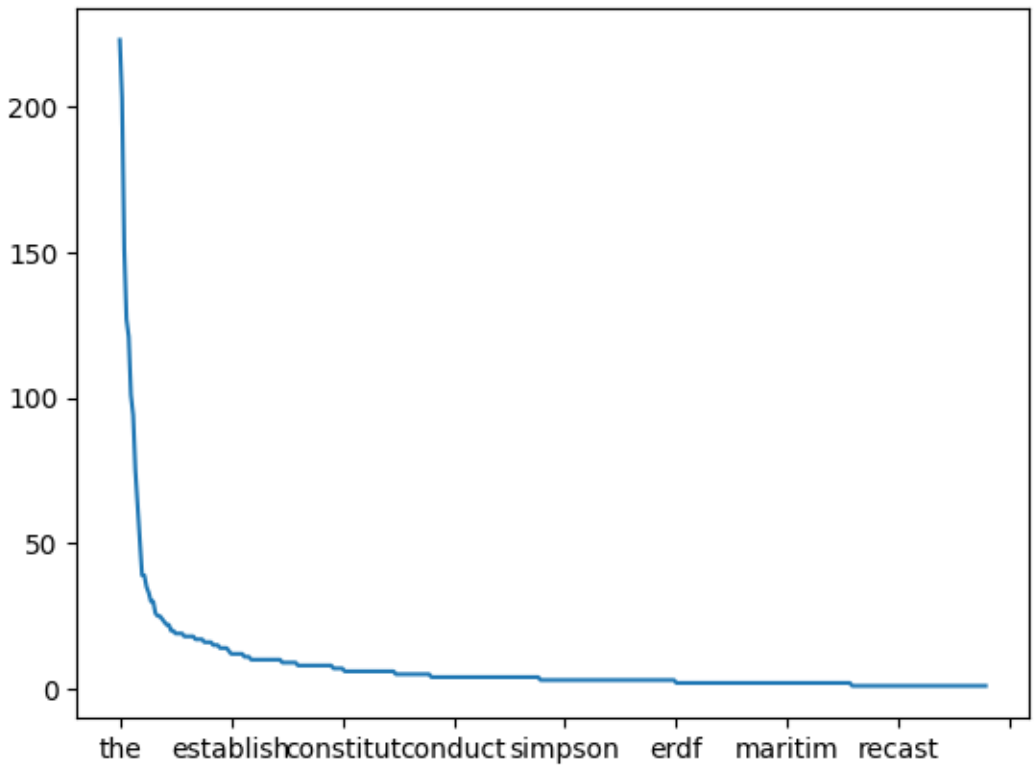
[ ]:

	data/32262848__AGENDA__20111130__EN.txt
the	223
of	203
on	151
a	127
committe	121
…	…
betwen	1
neighbourhood	1
strategi	1
favour	1
friday	1

[390 rows x 1 columns]

[ ]:
```
s.plot(kind="line")
```

[ ]: <Axes: >



Dokument 9

[ ]:
```
s, df = term_count(DOCUMENTS[8])
df
```

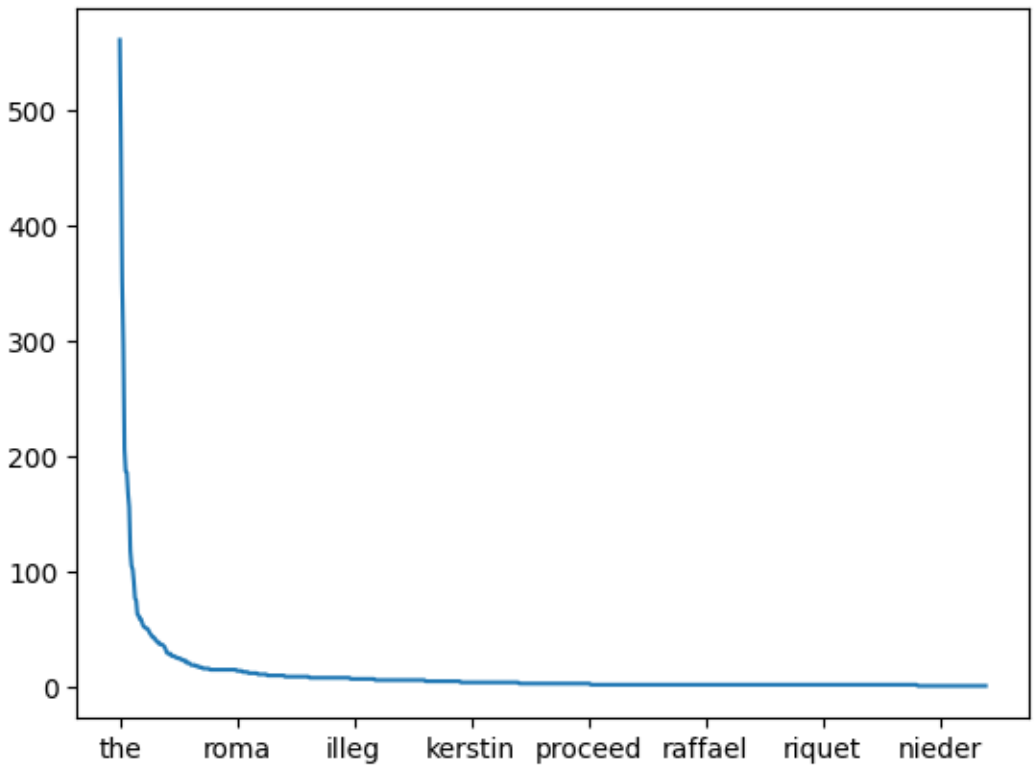
[ ]:

	data/32089495__AGENDA__20111114__EN.txt
the	561
of	467
and	352
on	297
european	206
…	…
hashemit	1
except	1
equival	1
such	1
each	1

[740 rows x 1 columns]

[ ]:
```
s.plot(kind="line")
```

[ ]: <Axes: >



Dokument 10

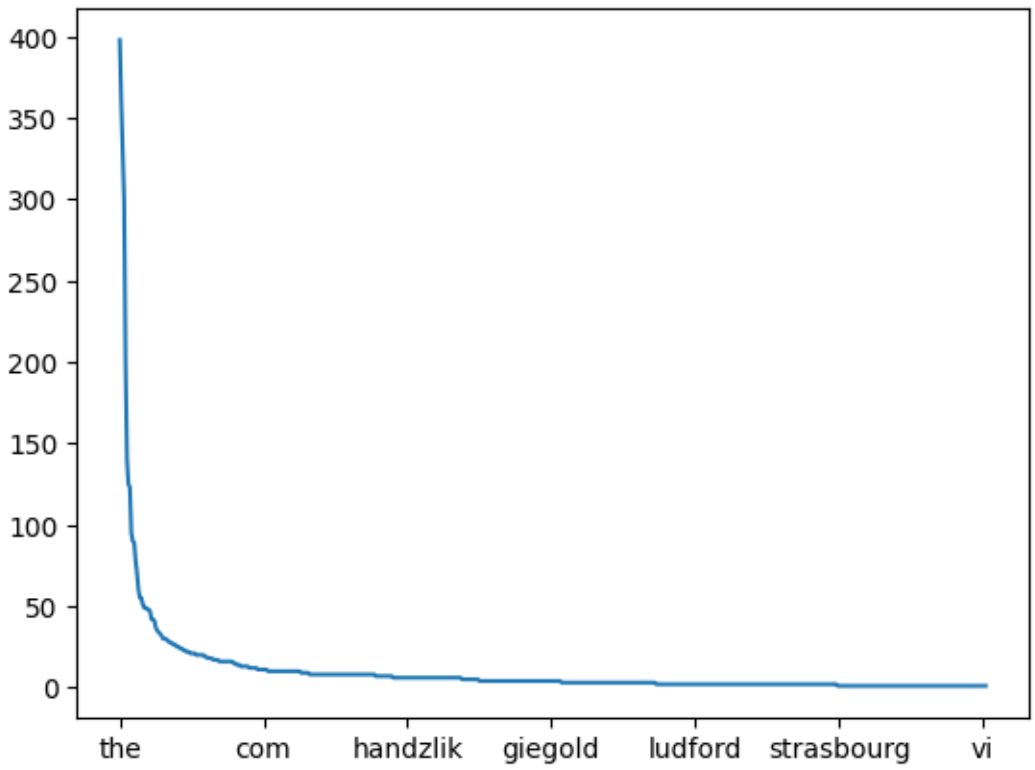
```
[ ]: s, df = term_count(DOCUMENTS[9])
     df
```

```
[ ]:          data/31793410__AGENDA__20111024__EN.txt
     the                                          398
     of                                           360
     and                                          332
     on                                           300
     committe                                     201
     …                                            …
     iv                                             1
     v                                              1
     vi                                             1
     vii                                            1
     each                                           1

     [603 rows x 1 columns]
```

```
[ ]: s.plot(kind="line")
```

```
[ ]: <Axes: >
```



1.1.4 6. Zbuduj stop listę wraz ze statystyką występowania słów. Usuń wyrazy ze stop listy z analizowanych tekstów. Uzasadnij, na jakiej podstawie słowa zostały sklasyfikowane jako należące do stop listy.

[ ]:
```
words = []
for doc in DOCUMENTS:
  with open(doc) as f:
    words.extend(re.findall(r"[a-zA-Z]+", f.read()))

s = pd.value_counts([stemmer.stem(word) for word in words], sort=True)
s.to_frame(name="Liczba wystąpień we wszystkich dokumentach")
```

[ ]:

	Liczba wystąpień we wszystkich dokumentach
the	3177
of	2844
and	2132
on	1917
committe	1287
…	…
hahn	1
ciolo	1
esther	1
are	1
sen	1

[1922 rows x 1 columns]

[ ]:
```
most_common = list(s.keys())[:200]
print(most_common)
```

```
['the', 'of', 'and', 'on', 'committe', 'for', 'a', 'european', 'group',
'report', 'in', 'democrat', 'b', 'affair', 'allianc', 'amend', 'wednesday',
'resolut', 'motion', 'to', 'council', 'parliament', 's', 'europ', 'debat',
'commiss', 'eu', 'rule', 'green', 'left', 'member', 'joint', 'march', 'vote',
'liber', 'monday', 'o', 'develop', 'intern', 'by', 'novemb', 'budget', 'peopl',
'decemb', 'februari', 'econom', 'rsp', 'tuesday', 'right', 'union', 'christian',
'rapporteur', 'parti', 'progress', 'agreement', 'socialist', 'ini', 'public',
'protect', 'food', 'polici', 'health', 'unit', 'request', 'free', 'market',
'confeder', 'nordic', 'safeti', 'at', 'foreign', 'democraci', 'recommend',
'com', 'monetari', 'propos', 'with', 'repli', 'financi', 'regul', 'fisheri',
'includ', 'environ', 'trade', 'decis', 'altern', 'octob', 'call', 'roll',
'split', 'direct', 'energi', 'separ', 'consum', 'women', 'thursday', 'applic',
'civil', 'budgetari', 'social', 'freedom', 'justic', 'employ', 'i', 'cod',
'legal', 'home', 'liberti', 'draft', 'product', 'research', 'state', 'between',
'januari', 'equal', 'presid', 'conserv', 'reformist', 'annual', 'control',
'gender', 'agricultur', 'as', 'ec', 'mr', 'least', 'mep', 'catch', 'eye',
'read', 'situat', 'fund', 'industri', 'non', 'attach', 'human', 'regard', 'rc',
'question', 'l', 'transport', 'programm', 'cooper', 'nle', 'section', 'no',
```

```
'concern', 'region', 'second', 'singl', 'statement', 'rural', 'court', 'case',
'tourism', 'certain', 'access', 'de', 'educ', 'manag', 'mobilis', 'defenc',
'framework', 'financ', 'text', 'instrument', 'conclus', 'it', 'morocco',
'elect', 'high', 'cultur', 'enlarg', 'compani', 'auditor', 'follow',
'establish', 'globalis', 'h', 'law', 'parliamentari', 'adjust', 'egf', 'govern',
'communiti', 'general', 'immun', 'barbara', 'oral', 'partnership', 'j',
'procedur', 'adopt', 'from', 'secur', 'author', 'their', 'repres', 'fish',
'polit']
```

Zdecydowano się usunąć wyrazy, które są popularne, ale nie wnoszą żadnych informacji.

[ ]:
```
STOP_WORDS = [
  "the",
  "of",
  "and",
  "on",
  "for",
  "a",
  "in",
  "to",
  "by",
  "at",
  "between",
  "as",
  "no",
  "it",
  "their",
  "from",
]

pd.DataFrame(
  data=[[sw, s[sw]] for sw in STOP_WORDS],
  columns=["Term", "Liczba wystąpień we wszystkich dokumentach"]
)
```

[ ]:

	Term	Liczba wystąpień we wszystkich dokumentach
0	the	3177
1	of	2844
2	and	2132
3	on	1917
4	for	1269
5	a	1126
6	in	623
7	to	381
8	by	170
9	at	110
10	between	73
11	as	67

12	no	52
13	it	42
14	their	31
15	from	32

1.1.5 7. Utwórz macierz częstotliwości TFM, w której element [di, ti] reprezentuje liczbę wystąpień słowa kluczowego ti w dokumencie di.

Uwaga! Macierze nie mają zawierać słów ze stop listy.

[ ]:
```
corpus = []
for doc in DOCUMENTS:
  with open(doc) as f:
    words = re.findall(r"[a-zA-Z]+", f.read())
  stemmed = list(filter(lambda word: word not in STOP_WORDS, (stemmer.
 ↪stem(word) for word in words)))
  corpus.append(stemmed)

counted = [pd.value_counts(doc, sort=True) for doc in corpus]
pd.DataFrame(data=counted).fillna(0).astype(int)
```

[ ]:

	committe	group	european	s	allianc	democrat	affair	april	europ	\
0	64	61	55	35	31	31	31	25	24	
1	90	17	55	12	6	6	46	0	4	
2	110	80	110	29	30	33	36	0	21	
3	145	107	113	29	45	48	57	0	31	
4	77	22	38	22	9	9	35	0	6	
5	56	44	53	7	13	17	2	0	17	
6	236	260	296	81	162	179	90	0	88	
7	121	19	63	25	6	10	51	0	4	
8	187	156	206	35	91	77	33	0	62	
9	201	95	123	49	55	60	78	0	49	

	report	…	fit	codifi	shortcom	sme	test	major	compon	america	\
0	21	…	0	0	0	0	0	0	0	0	
1	76	…	0	0	0	0	0	0	0	0	
2	60	…	0	0	0	0	0	0	0	0	
3	44	…	0	0	0	0	0	0	0	0	
4	54	…	0	0	0	0	0	0	0	0	
5	15	…	0	0	0	0	0	0	0	0	
6	98	…	0	0	0	0	0	0	0	0	
7	75	…	0	0	0	0	0	0	0	0	
8	102	…	0	0	0	0	0	0	0	0	
9	89	…	1	1	1	1	1	1	1	1	

	papanikolaou	appropri
0	0	0

```
1              0         0
2              0         0
3              0         0
4              0         0
5              0         0
6              0         0
7              0         0
8              0         0
9              1         1

[10 rows x 1906 columns]
```

1.1.6 8. Utwórz podobną macierz do powyższej, ale tym razem użyj miary tf-idf.

[ ]:
```
# TODO
```