

```
In [1]: import spacy
from spacy import displacy
from collections import Counter
import en_core_web_sm
nlp = en_core_web_sm.load()
```

```
In [8]: doc = nlp('I am happy to write this letter of recommendation for AAA wh
o intends to pursue a Masters degree at your prestigious university. I
have known him only for the past year and it was easy to observe that
he is a quick learner and hardworking. I handled the course Natural La
nguage Processing for him during his sixth semester. ')

print([(X.text, X.label_) for X in doc.ents])

[('AAA', 'ORG'), ('the past year', 'DATE'), ('his sixth semester', 'DATE')]
```

```
In [5]: print([(X, X.ent_iob_, X.ent_type_) for X in doc])

[(I, 'O', ''), (am, 'O', ''), (happy, 'O', ''), (to, 'O', ''), (write,
'O', ''), (this, 'O', ''), (letter, 'O', ''), (of, 'O', ''), (recommend
ation, 'O', ''), (for, 'O', ''), (AAA, 'B', 'ORG'), (who, 'O', ''), (in
tends, 'O', ''), (to, 'O', ''), (pursue, 'O', ''), (a, 'O', ''), (Maste
rs, 'O', ''), (degree, 'O', ''), (at, 'O', ''), (your, 'O', ''), (prest
igious, 'O', ''), (university, 'O', ''), (., 'O', ''), (I, 'O', ''), (h
ave, 'O', ''), (known, 'O', ''), (him, 'O', ''), (only, 'O', ''), (for,
'O', ''), (the, 'B', 'DATE'), (past, 'I', 'DATE'), (year, 'I', 'DATE'),
(and, 'O', ''), (it, 'O', ''), (was, 'O', ''), (easy, 'O', ''), (to,
'O', ''), (observe, 'O', ''), (that, 'O', ''), (he, 'O', ''), (is, 'O',
''), (a, 'O', ''), (quick, 'O', ''), (learner, 'O', ''), (and, 'O',
''), (hardworking, 'O', ''), (., 'O', ''), (I, 'O', ''), (handled, 'O',
''), (the, 'O', ''), (course, 'O', ''), (Natural, 'O', ''), (Language,
'O', ''), (Processing, 'O', ''), (for, 'O', ''), (him, 'O', ''), (durin
g, 'O', ''), (his, 'B', 'DATE'), (sixth, 'I', 'DATE'), (semester, 'I',
'DATE'), (., 'O', ''), ( , 'O', '')]
```

```
In [9]: len(doc.ents)
```

```
Out[9]: 3
```

```
In [10]: labels = [x.label_ for x in doc.ents]  
Counter(labels)
```

```
Out[10]: Counter({'ORG': 1, 'DATE': 2})
```

```
In [15]: sentences = [x for x in doc.sents]  
print(sentences)
```

[I am happy to write this letter of recommendation for AAA who intends to pursue a Masters degree at your prestigious university., I have know n him only for the past year and it was easy to observe that he is a qu ick learner and hardworking., I handled the course Natural Language Pro cessing for him during his sixth semester.]

```
In [16]: displacy.render(nlp(str(sentences)), jupyter=True, style='ent')
```

[I am happy to write this letter of recommendation for **AAA ORG** who intends to pursue a Masters degree at your prestigious university., I have known him only for **the past year DATE** and it was easy to observe that he is a quick learner and hardworking., I handled the course Natural Language Processing for him during **his sixth semester DATE** .]

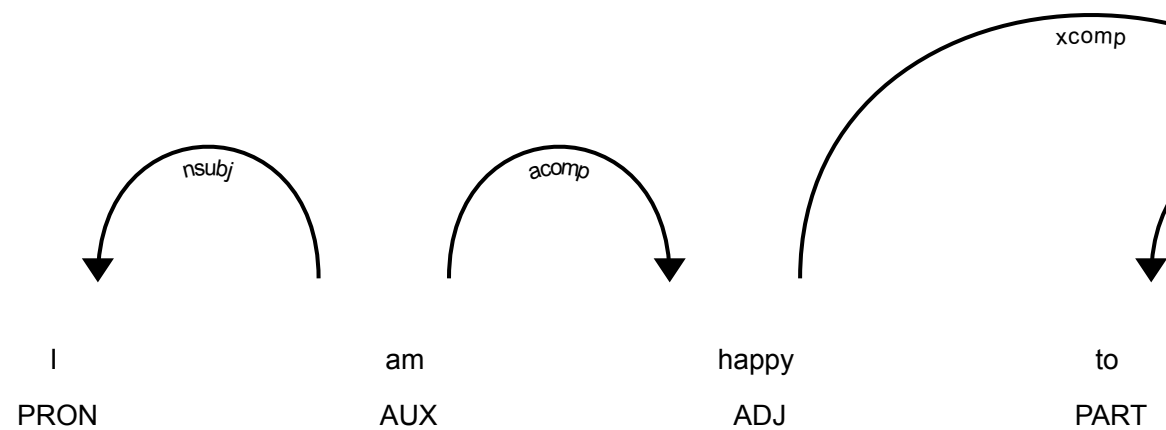
```
In [19]: for token in doc:  
         print(token, token.idx)
```

I 0
am 2
happy 5
to 11
write 14

this 20
letter 25
of 32
recommendation 35
for 50
AAA 54
who 58
intends 62
to 70
pursue 73
a 80
Masters 82
degree 90
at 97
your 100
prestigious 105
university 117
. 127
I 129
have 131
known 136
him 142
only 146
for 151
the 155
past 159
year 164
and 169
it 173
was 176
easy 180
to 185
observe 188
that 196
he 201
is 204
a 207
quick 209
learner 215

and 223
hardworking 227
. 238
I 240
handled 242
the 250
course 254
Natural 261
Language 269
Processing 278
for 289
him 293
during 297
his 304
sixth 308
semester 314
. 322
324

In [20]: `displacy.render(doc, style="dep", jupyter=True)`



```
In [ ]: from urllib import request
url=''
response=request.urlopen(url)
rawtext=response.read().decode('utf8')
type(rawtext)
```

```
In [ ]: doc=nlp(rawtext)
```

```
In [ ]: tokenlist=[]
for token in doc:
    tokenlist.append(token.text)
print(tokenlist)
```

```
In [21]: from bs4 import BeautifulSoup
import requests
import re
```

```
In [22]: def url_to_string(url):
    res = requests.get(url)
    html = res.text
    soup = BeautifulSoup(html, 'html5lib')
    for script in soup(["script", "style", "aside"]):
        script.extract()
    return " ".join(re.split(r'[\n\t]+', soup.get_text()))
```

```
In [23]: ny_bb = url_to_string('https://www.nytimes.com/2018/08/13/us/politics/peter-strzok-fired-fbi.html?hp&action=click&pgtype=Homepage&clickSource=story-heading&module=first-column-region&region=top-news&WT.nav=top-news')
```

```
In [24]: article = nlp(ny_bb)
len(article.ents)
```

Out[24]: 161

```
In [25]: labels = [x.label_ for x in article.ents]
Counter(labels)
```

```
Out[25]: Counter({'ORG': 43,
                  'PERSON': 75,
                  'DATE': 25,
                  'CARDINAL': 4,
                  'GPE': 9,
                  'NORP': 4,
                  'ORDINAL': 1})
```

```
In [26]: items = [x.text for x in article.ents]
Counter(items).most_common(3)
```

```
Out[26]: [('Strzok', 29), ('F.B.I.', 19), ('Trump', 12)]
```

```
In [27]: sentences = [x for x in article.sents]
print(sentences[20])
```

A spokeswoman for the F.B.I. did not respond to a message seeking comment about why Mr. Strzok was dismissed rather than demoted.

```
In [30]: displacy.render(nlp(str(sentences)), jupyter=True, style='ent')
```

[F.B.I. Agent **Peter Strzok PERSON** , Who Criticized Trump in **Texts ORG** , Is Fired - ,
The New York Times **ORG** SectionsSEARCHSkip **PRODUCT** to contentSkip to site
indexPoliticsToday's, PaperPolitics|F.B.I. Agent **Peter Strzok PERSON** , Who Criticized Trump
in **Texts ORG** , Is Firedhttps://nyti.ms/2OtNre3AdvertisementContinue reading the main
storySupported byContinue reading the main storyF.B.I. Agent **Peter Strzok PERSON** , Who
Criticized Trump in **Texts ORG** , Is **FiredPeter Strzok ORG** , a top **F.B.I. ORG**

counterintelligence agent who was taken off the special counsel investigation after his disparaging texts about President Trump PERSON were uncovered, was fired., Credit..., T.J. Kirkpatrick PERSON for The New York TimesBy ORG Adam Goldman PERSON and Michael S. SchmidtAug. PERSON , 13 DATE , 2018WASHINGTON DATE — Peter Strzok PERSON , the F.B.I. ORG senior counterintelligence agent who disparaged President Trump PERSON in inflammatory text messages and helped oversee the Hillary Clinton PERSON email and Russia GPE investigations, has been fired for violating bureau policies, Mr. Strzok PERSON 's lawyer said Monday DATE ., Mr., Trump PERSON and his allies seized on the texts — exchanged during the 2016 DATE campaign with a former F.B.I. ORG lawyer, Lisa Page PERSON — in assailing the Russia GPE investigation as an illegitimate “witch hunt.”, Mr. Strzok PERSON , who rose over 20 years DATE at the F.B.I. ORG to become one of its most experienced counterintelligence agents, was a key figure in the early months DATE of the inquiry., Along with writing the texts, Mr. Strzok PERSON was accused of sending a highly sensitive search warrant to his personal email account., The F.B.I. ORG had been under immense political pressure by Mr. Trump PERSON to dismiss Mr. Strzok PERSON , who was removed last summer DATE from the staff of the special counsel, Robert S. Mueller III. PERSON , The president has repeatedly denounced Mr. Strzok PERSON in posts on Twitter, and on Monday DATE expressed satisfaction that he had been sacked., Mr., Trump ORG 's victory traces back to June DATE , when Mr. Strzok PERSON 's

conduct was laid out in a wide-ranging inspector general's report on how the F.B.I. ORG handled the investigation of Hillary Clinton PERSON 's, emails in the run-up to the 2016 DATE election., The report was critical of Mr. Strzok PERSON 's conduct in sending the texts, and the bureau's Office of Professional Responsibility ORG said that Mr. Strzok PERSON should be suspended for 60 days DATE and demoted., Mr. Strzok PERSON had testified before the House ORG in July DATE about how he had not allowed his political views to interfere with the investigations he was overseeing., But Mr. Strzok PERSON 's lawyer said the deputy director of the F.B.I. ORG , David Bowdich PERSON , had overruled the Office of Professional Responsibility ORG and fired Mr. Strzok PERSON ., A spokeswoman for the F.B.I. ORG did not respond to a message seeking comment about why Mr. Strzok PERSON was dismissed rather than demoted., Firing Mr. Strzok PERSON , however, removes a favorite target of Mr. Trump PERSON from the ranks of the F.B.I. ORG and gives Mr. Bowdich PERSON and the F.B.I. ORG director, Christopher A. Wray PERSON , a chance to move beyond the president's ire., Aitan Goelman NORP , Mr. Strzok PERSON 's lawyer, denounced his client's dismissal., "The decision to fire Special Agent Strzok ORG is not only a departure from typical bureau practice, but also contradicts Director Wray PERSON 's testimony to Congress ORG and his assurances that the F.B.I. ORG intended to follow its regular process in this and all personnel matters," Mr. Goelman PERSON said., "This decision should be deeply troubling to all Americans NORP ,"

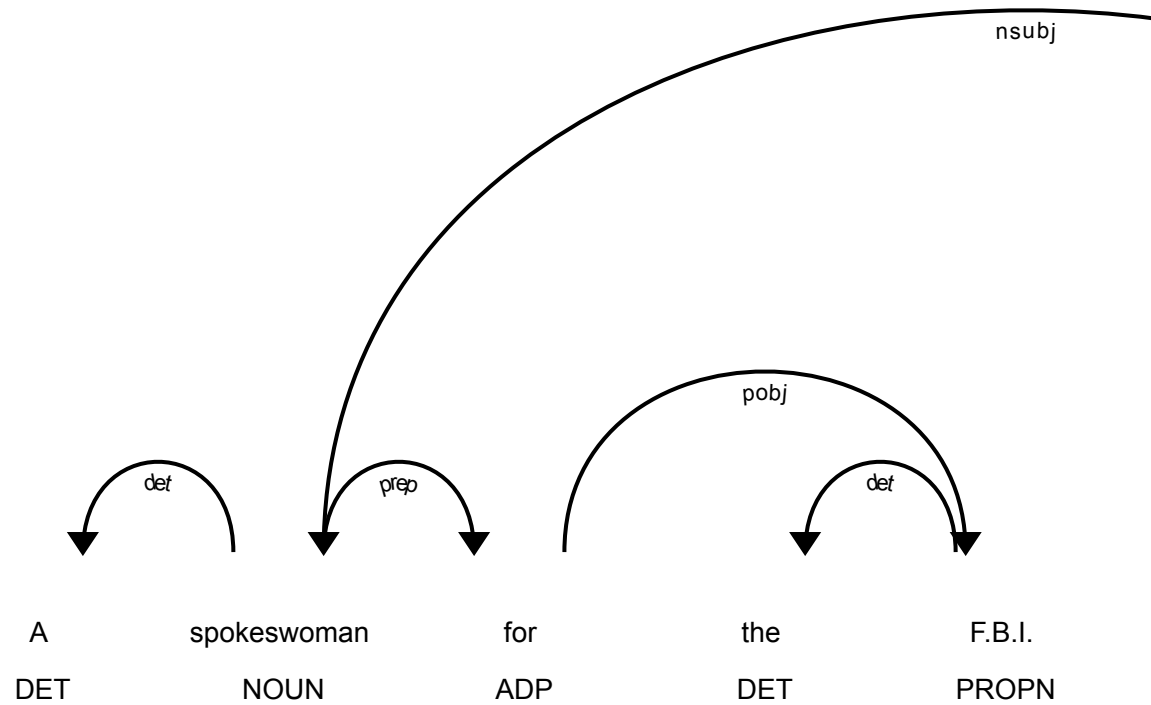
Mr. Goelman PERSON added., “A lengthy investigation and multiple rounds of congressional testimony failed to produce a shred of evidence that Special Agent Strzok ORG’s personal views ever affected his work., ”Mr., Strzok ORG’s, text exchanges with Ms. Page PERSON demonstrated animosity toward Mr. Trump PERSON., In one CARDINAL, Ms. Page PERSON asks: Trump is “not ever going to become president, right?, Right?!”, Mr. Strzok PERSON responds: “No., No he won’t., We’ll stop it.”, The inspector general, who uncovered the messages, found no evidence that the pair imposed their political views on their investigative decisions but cited that exchange as “not only indicative of a biased state of mind, but, even more seriously, implies a willingness to take official action to impact the presidential candidate’s electoral prospects., ”The report by the inspector general, Michael E. Horowitz PERSON, that preceded Mr. Strzok PERSON’s firing not only criticized his conduct in sending the texts but also his use of personal email accounts to handle sensitive information., In addition, the inspector general criticized Mr. Strzok PERSON’s decision not to move swiftly to examine new emails related to the Clinton PERSON investigation just weeks DATE before the 2016 DATE election., Mr., Horowitz PERSON said in his report that he was “deeply troubled” by the text messages., Hundreds CARDINAL exchanged over months DATE were found in which the pair disparaged Mr. Trump PERSON and, to a lesser extent, Mrs. Clinton PERSON, exchanged work gossip and bantered., On Twitter, Mr. Strzok PERSON said he was “deeply saddened by this decision,” adding, “It has been an honor to serve my country and work with the

fine men and women of the FBI.”Mr., **Strzok** **ORG** became emblematic of Mr. **Trump** **PERSON** ’s unfounded assertions that a so-called deep state of bureaucrats opposed to him was undermining his presidency., Mr. **Trump** **PERSON** contended that Mr. **Strzok** **PERSON** targeted the president and accused Mr. **Strzok** **PERSON** of being “treasonous” and a “disgrace.”, Mr. **Strzok** **PERSON** told lawmakers that he never leaked information about the **Russia** **GPE** inquiry, which could have upended the election and hurt Mr. **Trump** **PERSON** ’s chances of becoming president., After Mr. **Horowitz** **PERSON** uncovered the texts, Mr. **Mueller** **PERSON** , who had by then taken over the investigation, removed Mr. **Strzok** **PERSON** from his team., He was reassigned to the **F.B.I.** **ORG** ’s human resources division., Ms. **Page** **PERSON** , who had left Mr. **Mueller** **PERSON** ’s team before the discovery of the text messages, quit the **F.B.I.** **ORG** in **May.** **GPE** , The inspector general’s report also took issue with the reaction by Mr. **Strzok** **PERSON** and other **F.B.I.** **ORG** officials to the discovery of possible new evidence in the **Clinton** **PERSON** investigation, known internally as **Midyear Exam** **ORG** , in **late September 2016** **DATE** on a laptop that belonged to the disgraced politician **Anthony D. Weiner** **PERSON** , the husband of a top **Clinton** **PERSON** aide., At the time, Mr. **Strzok** **PERSON** was in the early stages of investigating whether any **Trump** **ORG** associates had conspired with **Russia** **GPE** ’s interference in the presidential election, and **nearly a month** **DATE** passed before agents and analysts began to act on the emails found on Mr. **Weiner** **PERSON** ’s laptop., Mr. **Horowitz** **PERSON** could not rule out

that Mr. **Strzok PERSON** had slow-walked the examination of the new emails to help Mrs. **Clinton PERSON** 's presidential bid., "Under these circumstances, we did not have confidence that **Strzok ORG** 's decision to prioritize the **Russia GPE** investigation over following up on the **Midyear DATE** -related investigative lead discovered on the **Weiner ORG** laptop was free from bias," he wrote., The delays were merely the "result of bureaucratic snafus," Mr. **Strzok PERSON** 's lawyer wrote **last month DATE** in **USA GPE** Today., But the justifications for the delay were "unpersuasive" and had "far-reaching consequences," the inspector general said., **James B. Comey PERSON** , the former **F.B.I. ORG** director, has told investigators that if he had known about the emails earlier, it might have influenced his decision to alert **Congress ORG** to their existence **days DATE** before the election., In addition, the inspector general said that Mr. **Strzok PERSON** had forwarded a proposed search warrant to his personal email account., The inspector general said the email, which included a draft of the search warrant affidavit, contained information that appeared to be under seal., In a heated congressional hearing **last month DATE** , Mr. **Strzok PERSON** expressed "significant regret" for the texts and rebutted the president's attacks on the **Russia GPE** inquiry., "This investigation is not politically motivated; it is not a witch hunt; it is not a hoax," he said., Mr., **Strzok ORG** 's, dismissal was not unexpected., He is the **second ORDINAL** senior **F.B.I. ORG** agent to be fired as a result of the inspector general's investigation., In **March DATE** , **Andrew G. McCabe PERSON** , the former deputy director, was fired after the

inspector general repeatedly faulted him for misleading investigators., The firing was politically motivated, Mr. **McCabe PERSON** has said, as an effort to discredit him as a witness in the special counsel investigation., Both men were fired before they were eligible for their pension and health benefits., Mr., **Strzok ORG** , **48 DATE** , a graduate of **Georgetown University ORG** , served as an officer in the **Army ORG** before he joined the **F.B.I. ORG** , He held several key positions in the **F.B.I. ORG** , eventually becoming a top deputy in the counterintelligence division., He handled many important espionage cases including **one CARDINAL** involving a former **C.I.A. ORG** officer suspected of working for **China GPE** and a group of **Russian NORP** spies who had been working undercover in **the United States GPE** ., **AdvertisementContinue ORG** reading the main storySite **IndexSite ORG** Information Navigation© , **2020 DATE** , **The New York Times CompanyNYTCoContact ORG** UsWork with usAdvertiseT, Brand StudioYour Ad ChoicesPrivacyTerms of **ServiceTerms ORG** of **SaleSite MapHelpSubscriptions] ORG**

In [29]: `displacy.render(nlp(str(sentences[20])), style='dep', jupyter = True, options = {'distance': 120})`



In []: