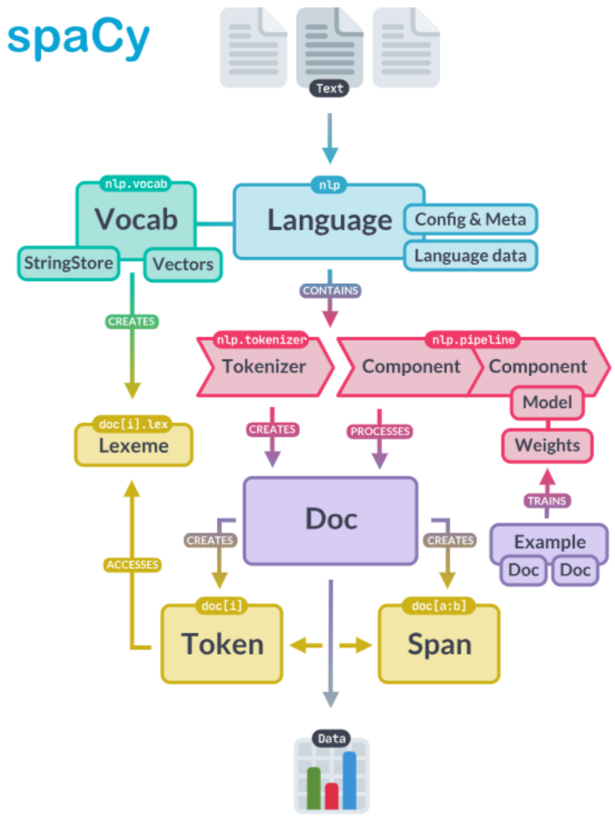
01 Spacy Tokenization

December 20, 2025

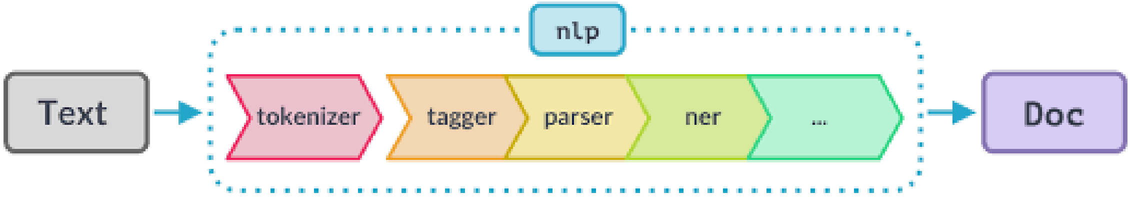
1 Tokenization



[1]:
```
import spacy
from prettytable import PrettyTable
```

[2]:
```
nlp = spacy.load('en_core_web_sm')
```

[3]:
```
text = "Hello Uditya Narayan Tiwari! let's learn NLP together i am 21"
```



[4]:
```
doc = nlp(text)
doc
```

[4]:
```
Hello Uditya Narayan Tiwari! let's learn NLP together i am 21
```

[5]:
```
doc.to_dict()
```

[5]:
```
{'text': "Hello Uditya Narayan Tiwari! let's learn NLP together i am 21",
 'array_head': (71, 81, 65, 67, 75, 79, 76, 77, 78, 452, 454, 73, 453, 74, 80),
 'array_body': array([[                   5,                    1,
15777305708150031551,
          5983625672228268878,  3252815442139690129,                    0,
          8206900633647566924,                    2,                    0,
                            0,                    0,  5983625672228268878,
                          456,                   91,                    1],
        [                   6,                    1,   621519759253969662,
         12044956042206692584, 15794550382381185553,                    2,
          7037928807040764755,                    3,                  380,
                            0,                    0,   621519759253969662,
         11292551915497242671,                   96, 18446744073709551615],
        [                   7,                    1, 17937943263439891957,
          1332317125561210957, 15794550382381185553,                    1,
          7037928807040764755,                    1,                  380,
                            0,                    0, 17937943263439891957,
         11292551915497242671,                   96, 18446744073709551615],
        [                   6,                    0,  7708786325424957310,
         17610643503028872449, 15794550382381185553, 18446744073709551613,
                          428,                    1,                  380,
                            0,                    0,  7708786325424957310,
         11292551915497242671,                   96, 18446744073709551615],
        [                   1,                    1, 17494803046312582752,
         17494803046312582752, 12646065887601541794, 18446744073709551612,
                          445,                    2,                    0,
                            0,                    0, 17494803046312582752,
          6739740606194143788,                   97, 18446744073709551615],
        [                   3,                    0,   278066919066513387,
           278066919066513387, 14200088355797579614,                    0,
          8206900633647566924,                    2,                    0,
                            0,                    0,   278066919066513387,
          4068996703163926224,                  100,                    1],
        [                   2,                    1, 16428057658620181782,
          4950757572332304006, 13656873538139661788,                    1,
                          429,                    2,                    0,
                            0,                    0,  4950757572332304006,
         12523944338091500347,                   95, 18446744073709551615],
        [                   5,                    1,  9664905639869093544,
          9664905639869093544, 14200088355797579614, 18446744073709551614,
                          408,                    2,                    0,
                            0,                    0,  9664905639869093544,
          4068996703163926224,                  100, 18446744073709551615],
        [                   3,                    1, 15832915187156881108,
         11273594034978133401, 15794550382381185553, 18446744073709551615,
                          416,                    3,                  383,
                            0,                    0, 15832915187156881108,
         11292551915497242671,                   96, 18446744073709551615],
        [                   8,                    1, 12060003407050460571,
         12060003407050460571,   164681854541413346, 18446744073709551614,
                          400,                    2,                    0,
                            0,                    0, 12060003407050460571,
                          456,                   86, 18446744073709551615],
        [                   1,                    1,  5097672513440128799,
          5097672513440128799, 13656873538139661788,                    1,
                          429,                    2,                    0,
                            0,                    0,  4690420944186131903,
          8572492957087256302,                   95, 18446744073709551615],
        [                   2,                    1,   959164148857638496,
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                            0,                    0, 10382539506755952630,
          1447802835980306976,                   87, 18446744073709551615],
        [                   2,                    0,  4686009691886217934,
          4686009691886217934,  8427216679587749980, 18446744073709551615,
                          404,                    2,                    0,
                            0,                    0,  4686009691886217934,
          1599824077107694006,                   93, 18446744073709551615]],
       dtype=uint64),
 'sentiment': 0.0,
 'tensor': array([[ 0.05445875, -0.59416246,  0.818173  , …,  0.38977188,
         -0.40392596,  1.4487071 ],
        [-0.04225922, -1.1231196 ,  1.6962935 , …,  0.59242487,
          0.6001835 ,  0.16076504],
        [ 0.24459338, -1.140665  ,  0.28151155, …,  0.08815472,
          0.8826299 , -0.05909336],
        …,
        [-1.0578656 , -0.7674625 , -0.77184594, …,  0.47284043,
         -0.36860317,  0.25863093],
        [-0.13910657, -0.273593  , -0.9564745 , …,  0.04795459,
         -0.00504667,  2.2988346 ],
        [-0.23384394,  0.4510045 ,  0.6332393 , …,  0.61563087,
         -0.33255428, -0.26758942]], dtype=float32),
 'cats': {},
 'spans': b'\x90',
 'strings': ['',
  'PERSON',
  'narayan',
  'ROOT',
  'PronType=Prs',
  '21',
  'npadvmod',
  'tiwari',
  'hello',
  'attr',
  'VB',
  'ORG',
  'Number=Sing',
  'dobj',
  'VBP',
  'Mood=Ind|Number=Sing|Person=1|Tense=Pres|VerbForm=Fin',
  'Narayan',
  'learn',
  '.',
  'Uditya',
  'NumType=Card',
  'NNP',
  'Tiwari',
  'I',
  'punct',
  'advmod',
  'NLP',
  '!',
  'let',
  'compound',
  'be',
  'CD',
  'VerbForm=Inf',
  'us',
  'nlp',
  'PunctType=Peri',
  'UH',
  'together',
  'i',
  'am',
  'uditya',
  'ccomp',
    'RB',
    'nsubj',
    'Case=Nom|Number=Sing|Person=1|PronType=Prs',
    'PRP'],
   'has_unknown_spaces': False}
```

[6]:
```python
for token in doc:
        print(token.text, token.is_alpha, token.is_punct, token.like_num)
```

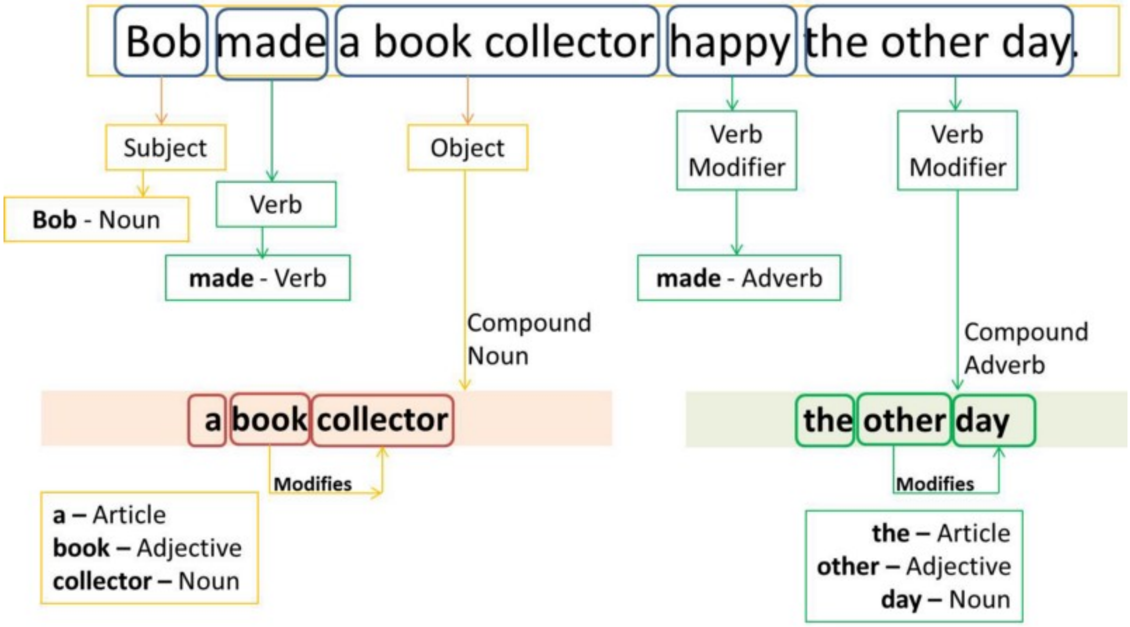
```
Hello True False False
Uditya True False False
Narayan True False False
Tiwari True False False
! False True False
let True False False
's False False False
learn True False False
NLP True False False
together True False False
i True False False
am True False False
21 False False True
```

[7]:
```python
table = PrettyTable()
table.field_names = ['token', 'is alpha', 'is punct', 'is number']
for token in doc:
        table.add_row([token.text, token.is_alpha, token.is_punct, token.
 ↪like_num])
```

[8]:
```python
print(table)  # so using pretty table we can see the things proper in the␣
 ↪formatted way
```

```
+----------+----------+----------+-----------+
|  token   | is alpha | is punct | is number |
+----------+----------+----------+-----------+
|  Hello   |   True   |  False   |   False   |
|  Uditya  |   True   |  False   |   False   |
| Narayan  |   True   |  False   |   False   |
|  Tiwari  |   True   |  False   |   False   |
|    !     |  False   |   True   |   False   |
|   let    |   True   |  False   |   False   |
|    's    |  False   |  False   |   False   |
|  learn   |   True   |  False   |   False   |
|   NLP    |   True   |  False   |   False   |
| together |   True   |  False   |   False   |
|    i     |   True   |  False   |   False   |
|    am    |   True   |  False   |   False   |
|    21    |  False   |  False   |    True   |
+----------+----------+----------+-----------+
```

2 Part Of Speech(POS) Tagging



[9]:
```python
doc
```

[9]:
```
Hello Uditya Narayan Tiwari! let's learn NLP together i am 21
```

[10]:
```python
table = PrettyTable()
table.field_names = ['token', 'pos', 'details', 'explanation']

for token in doc:
        table.add_row([token.text, token.pos_, token.tag_, spacy.explain(token.
 ↪tag_)])

print(table)
```

```
+----------+-------+---------+--------------------------------------+
|  token   |  pos  | details |             explanation              |
+----------+-------+---------+--------------------------------------+
|  Hello   |  INTJ |    UH   |             interjection             |
|  Uditya  | PROPN |   NNP   |        noun, proper singular         |
| Narayan  | PROPN |   NNP   |        noun, proper singular         |
|  Tiwari  | PROPN |   NNP   |        noun, proper singular         |
|    !     | PUNCT |    .    |  punctuation mark, sentence closer   |
|   let    |  VERB |    VB   |           verb, base form            |
|    's    |  PRON |   PRP   |          pronoun, personal           |
|  learn   |  VERB |    VB   |           verb, base form            |
|   NLP    | PROPN |   NNP   |         noun, proper singular         |
| together |  ADV  |    RB   |                 adverb                |
|    i     |  PRON |   PRP   |           pronoun, personal           |
|    am    |  AUX  |   VBP   | verb, non-3rd person singular present |
|    21    |  NUM  |    CD   |            cardinal number            |
+----------+-------+---------+---------------------------------------+
```