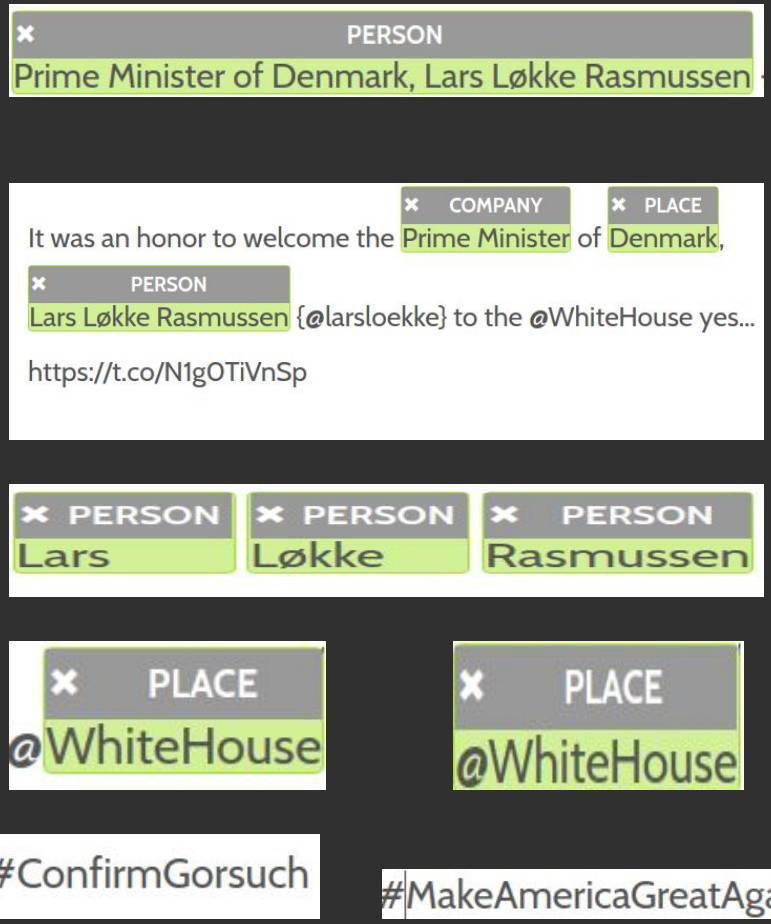
Tokenization

Given a character sequence and a defined document unit,

tokenization is the task of chopping it up into pieces, called tokens , perhaps at the same time throwing away certain characters, such as punctuation.



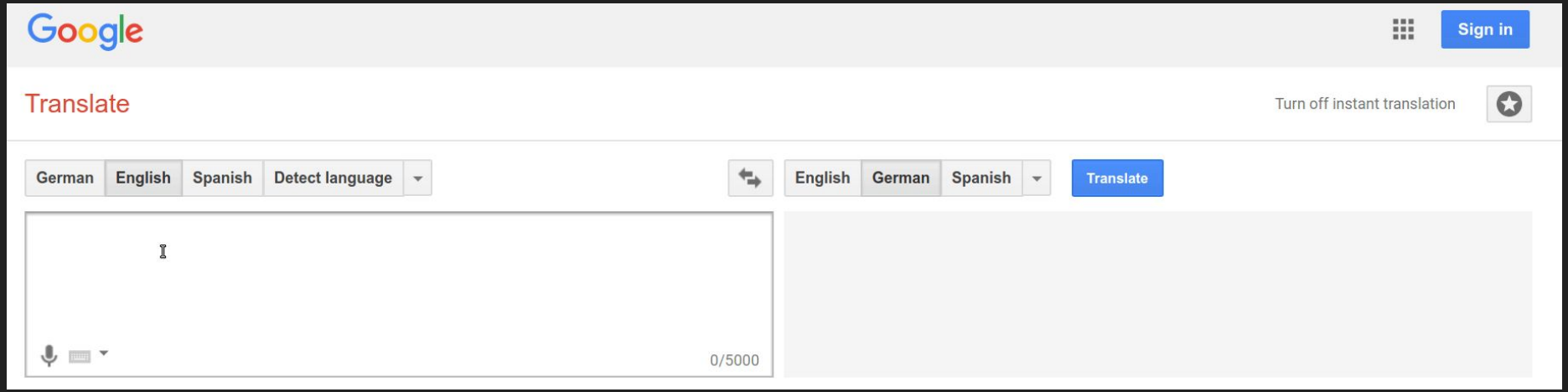
Light TAG

Tokenization is the most important choice in NLP

That people don’t think about

- Tokens are the smallest unit your model can see
- If you make them too small they are meaningless
- If you make them too big
  - You get too many
  - And not enough data to learn
- A change in tokenization can make a task easy or hard

The difference a space can make



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But punctuation and white space are good indicators

President Donald Trump won’t pay $7.73 for his hat ⇒

President
Donald
Trump
won
t
pay
$7
.73
for
his
hat

Should everything be a different token ?

0. *frog*
1. frogs
2. toad
3. litoria
4. leptodactylidae
5. rana
6. lizard
7. eleutherodactylus

3. litoria

4. leptodactylidae

5. rana

7. eleutherodactylus

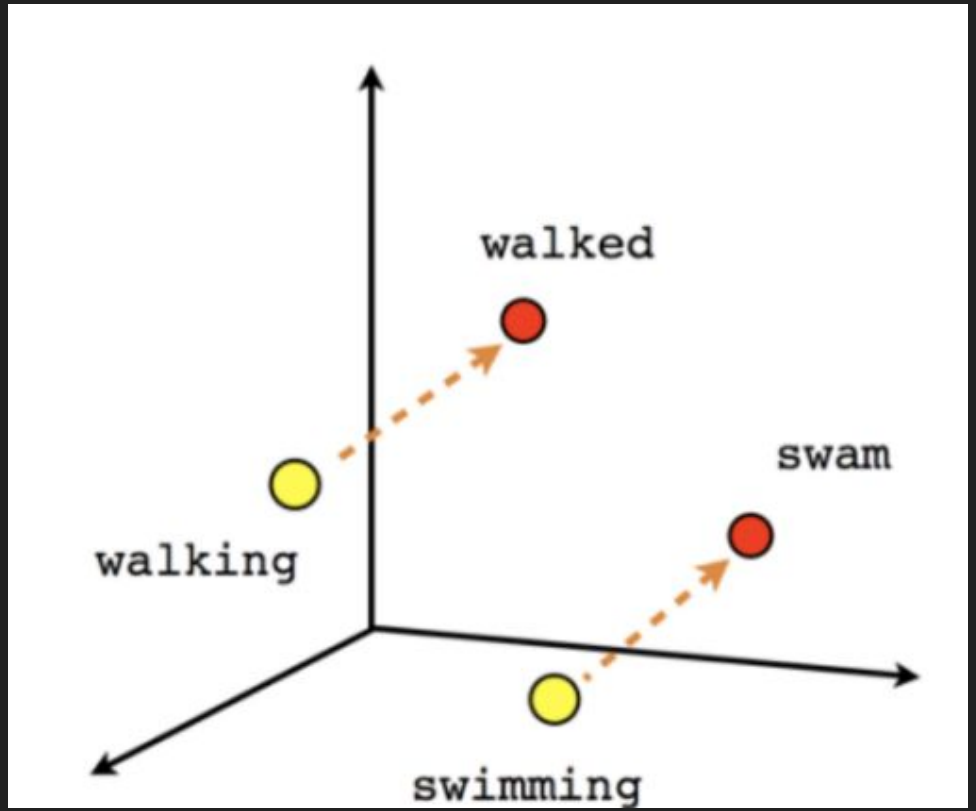
Should everything be a different token ?

Type	Occurrences	Rank
the	3789654	1st
he	2098762	2nd
[...]		
king	57897	1,356th
boy	56975	1,357th
[...]		
stringyfy	5	34,589th
[...]		
transducionalify	1	123,567th

01/01/1970	01/02/1970	01/03/1970	01/04/1970	01/05/1970
01/01/1971	01/02/1971	01/03/1971	01/04/1971	01/05/1971
01/01/1972	01/02/1972	01/03/1972	01/04/1972	01/05/1972
01/01/1973	01/02/1973	01/03/1973	01/04/1973	01/05/1973
01/01/1974	01/02/1974	01/03/1974	01/04/1974	01/05/1974
01/01/1975	01/02/1975	01/03/1975	01/04/1975	01/05/1975
01/01/1976	01/02/1976	01/03/1976	01/04/1976	01/05/1976
01/01/1977	01/02/1977	01/03/1977	01/04/1977	01/05/1977
01/01/1978	01/02/1978	01/03/1978	01/04/1978	01/05/1978
01/01/1979	01/02/1979	01/03/1979	01/04/1979	01/05/1979
01/01/1980	01/02/1980	01/03/1980	01/04/1980	01/05/1980
01/01/1981	01/02/1981	01/03/1981	01/04/1981	01/05/1981
01/01/1982	01/02/1982	01/03/1982	01/04/1982	01/05/1982
01/01/1983	01/02/1983	01/03/1983	01/04/1983	01/05/1983
01/01/1984	01/02/1984	01/03/1984	01/04/1984	01/05/1984
01/01/1985	01/02/1985	01/03/1985	01/04/1985	01/05/1985
01/01/1986	01/02/1986	01/03/1986	01/04/1986	01/05/1986
01/01/1987	01/02/1987	01/03/1987	01/04/1987	01/05/1987

Light TAG

What about Morphology



כטובל ושרץ בידו

You can write clever functions that tokenize

```
import re
dateReg=re.compile(r'(\d{2}[-\\]){2}\d{4}')
def tokenize(sentence):
    sentence = dateReg.sub("_DATE_",sentence)
    tokens = sentence.split()
    return tokens
tokenize(u"I went to the store on 12\\12\\1984 and 12\\24\\1976")
```

```
['I', 'went', 'to', 'the', 'store', 'on', '_DATE_', 'and', '_DATE_']
```

And you should, in light of the problem your solving

```
import re
dateReg=re.compile(r'(\d{2}[-\\]){2}\d{4}')
def tokenize(sentence):
    sentence = dateReg.sub("_DATE_",sentence)
    tokens = sentence.split()
    return tokens
tokenize(u"I went to the store on 12\\12\\1984 and 12\\24\\1976")
```

```
['I', 'went', 'to', 'the', 'store', 'on', '_DATE_', 'and', '_DATE_']
```

What to consider ?

- Do I know what is relevant in the text ?
- Do I know what can be thrown away ?
- Does my model calculate interactions between tokens ?
- Each token is a feature, I need ~10 examples per feature ?
- Each token is a feature, will my model fit in memory ?
- Each token is a feature, will my model overfit ?
- **What representation of the data best suits my task ?**

Resources

- Stanford NLP Group
- Snowball Stemmer
- How Spacy Tokenizes