



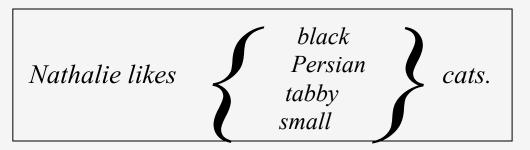
Introduction to NLP

Parts of speech



Syntactic Categories

Substitution test:



• Open (lexical) and closed (functional) categories:

No-fly-zone twerk the in



Example

The dog chased the yellow bird.

- Parts of speech
 - eight (or so) general types
 - nouns, verbs, adjectives...



Nouns

- Examples
 - dog, tree, computer, idea
- Nouns vary in
 - number (singular, plural)
 - gender (masculine, feminine, neuter)
 - case (nominative, genitive, accusative, dative)
- Case example in Latin
 - Singular: puer (nominative), puerum (accusative), puerī (genitive)
 - Plural: puerī (nominative), puerōs (accusative), puerōrum (genitive)
- · Gender example in German
 - Mädchen (neuter gender)



Jabberwocky (Lewis Carroll)

'Twas brillig, and the slithy toves Did gyre and gimble in the wabe: All mimsy were the borogoves, And the mome raths outgrabe.

 What are the parts of speech for the words in bold?





Answers

'Twas brillig, and the slithy toves Did gyre and gimble in the wabe: All mimsy were the borogoves, And the mome raths outgrabe.

- Wabe, borogoves
 - Nouns (after "the")
- brillig
 - adjective?
 - noun? ("noon")
- mimsy
 - adjective
- slighty toves
 - adjective+noun?
 - noun+verb? ("the bell tolls")
- mome raths outgrabe
 - Adjective+noun+verb?
 - Noun+verb+adverb? ("birds fly outside")



Why is this an Important Example?

- Computers see text that they don't really understand.
- They have to use some prior knowledge.
- They reason probabilistically.
- They use context.
- The can be wrong.



Pronouns

- Examples
 - she, ourselves, mine
- Pronouns vary in
 - person
 - gender
 - number
 - case (in English: nominative, accusative, possessive, 2nd possessive)
- Reflexive and anaphoric forms
 - herself, each other

Samantha gave <u>her a haircut.</u>
Samantha gave <u>herself</u> a haircut.



Determiners and Adjectives

Determiners

- Articles
 - the, a
- Demonstratives
 - this, that

Adjectives

- describe properties
- attributive and predicative adjectives
- agreement
 - in gender, number
- comparative and superlative forms
 - derivative and periphrastic
- positive form



Verbs

- Describe
 - actions, activities, and states (throw, walk, have)
- English
 - four verb forms
- tense
 - present, past, future
- other inflection
 - number, person
- gerunds and infinitive
- aspect
 - progressive, perfective
- Voice
 - active, passive



Verbs

- Participles, auxiliaries
- Arguments:
 - The dog sleeps (intransitive)
 - The dog chased the cat (transitive)
 - Mary gave the dog a bone (ditransitive)
- Irregular verbs
- Richer inflections
 - E.g., French, Latin, and Finnish



Verb Conjugation in French

Present

je vais I go
tu vas you go
il va he goes
nous allons we go
vous allez you go
ils vont they go

Conditional

j'irais I would go
tu irais you would go
il irait he would go
nous irions we would go
vous iriez you would go
ils iraient they would go

Past

je suis allé(e) I went
tu es allé(e) you went
il est allé(e) he went
nous sommes allé(e)s we went
vous êtes allé(e)s you went
ils sont allé(e)s they went

Future

j'irai I will go
tu iras you will go
il ira he will go
nous irons we will go
vous irez you will go
ils iront they will go

Imperfect

j'allais I used to go
tu allais you used to go
il allait he used to go
nous allions we used to go
vous alliez you used to go
ils allaient they used to go

Subjunctive

que j'aille that I go
que tu ailles that you go
qu'il aille that he go
que nous allions that we go
que vous alliez that you go
qu'ils aillent that they go



Other Parts of Speech

- Adverbs
 - happily, here, never
- Prepositions
 - of, through, in
- Particles
 - Phrasal verbs
 - the plane took off, take it off
- Particles vs. prepositions
 - She ran up a bill/hill





Other Parts of Speech

- Coordinating conjunctions
 - and, or, but
- Subordinating conjunctions
 - if, because, that, although
- Interjections
 - Ouch!



Part of Speech Tags

```
/* singular noun */
NN
     /* preposition */
ΤN
ΑТ
   /* article */
   /* proper noun */
NΡ
   /* adjective */
JJ
      /* comma */
NNS
   /* plural noun */
CC
  /* conjunction */
RB
     /* adverb */
     /* un-inflected verb */
VB
     /* verb +en (taken, looked (passive, perfect)) */
VBN
     /* verb +ed (took, looked (past tense)) */
VBD
      /* subordinating conjunction */
CS
```

