Constituency Parsing

Presenter: Stephanie

Outline

1 What is a constituent

2 Context Free Grammar

3 Constituency Parsing in TreeRNN

How do words group together in English?

Consider a noun phrase. What evidence do we have that these words group together?

Harry the Horse

The Broadway show

they

Evidence of grouping

Three parties from Taiwan *arrive* …

The Broadway show *represents* ..

They *sit* ..

Noun phrases can occur before verbs.

On December tenth, I'd like to take Singapore Airlines from Singapore to Bangkok

I'd like to fly *on December tenth* from Singapore to Bangkok

I'd like to fly from Singapore to Bangkok *on December tenth*.

Preposed or postposed constructions.

1 Constituency

Constituency is the that of abstraction -- group of words behaving as single units, or constituences.

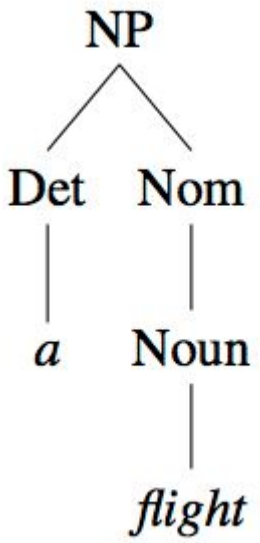
2 Context-free Grammars (CFG)

- Formal system for modeling constituent structure in English
- Also known as Phrase-Structure Grammars

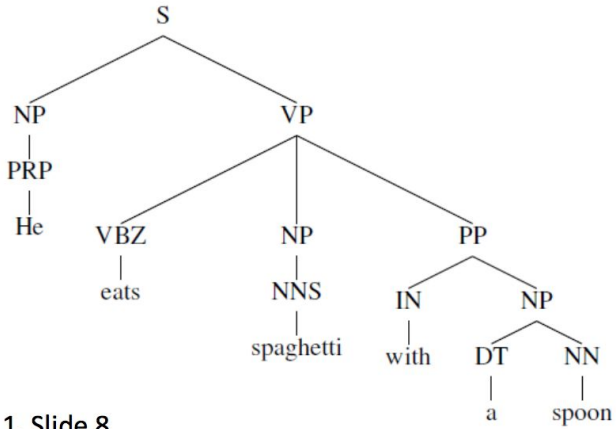
- CFG consists of set of rules or production; expresses the way the language can be group and ordered together
- The rules can be hierachically embedded, so we can combine the previous rules with others

Example of rule embedding

A parse tree for “flight”



A parse tree for “He eats spaghetti with a spoon.”



Lecture 1, Slide 8

Are languages recursive?

Noam Chomsky: Recursion as a natural way for describing langauge

This is a cognitively debatable.

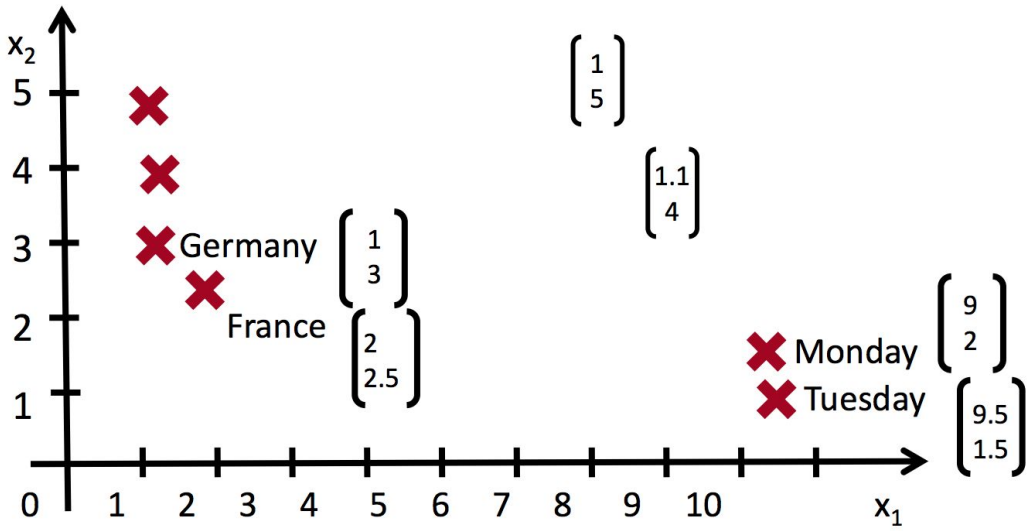
[The man from [the canteen that you spoke with about [the food] yesterday]]

Arguments: 1) Helpful for disambiguation

2) Helpful for tasks with specific phrases

3) Works better for some tasks to use grammatical tree structure

Building on Word Vector Space Models



the country of my birth
the place where I was born

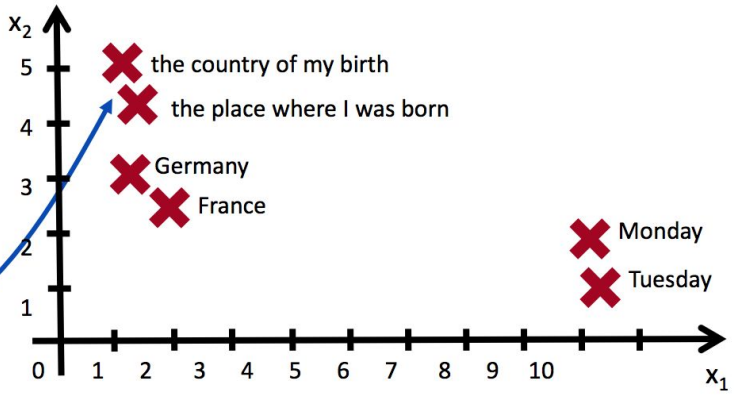
How can we represent the meaning of longer phrases?

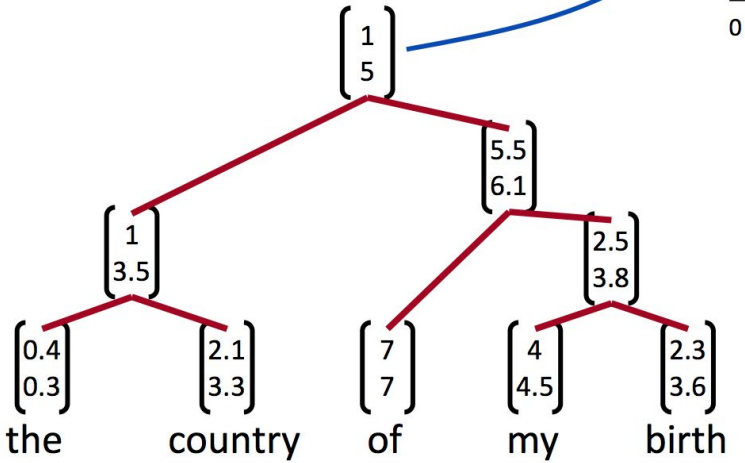
By mapping them into the same vector space!

How should we map phrases into a vector space?

Use principle of compositionality

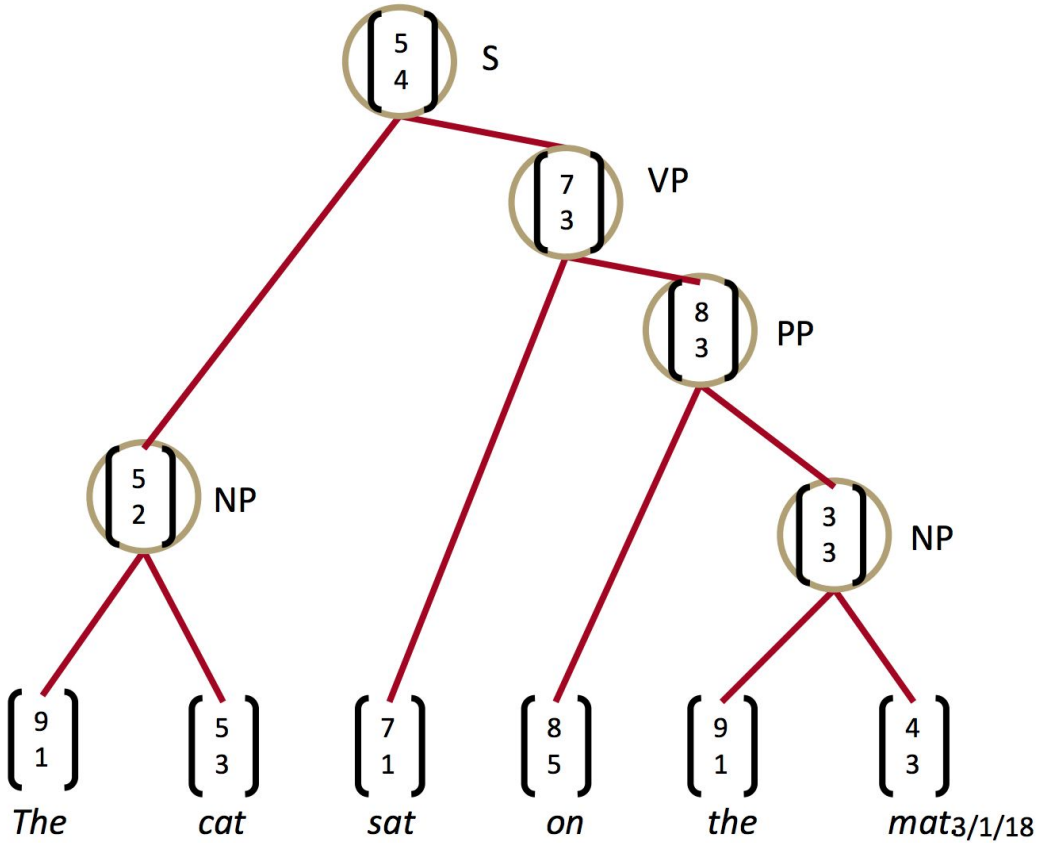
The meaning (vector) of a sentence is determined by
(1) the meanings of its words and
(2) the rules that combine them.



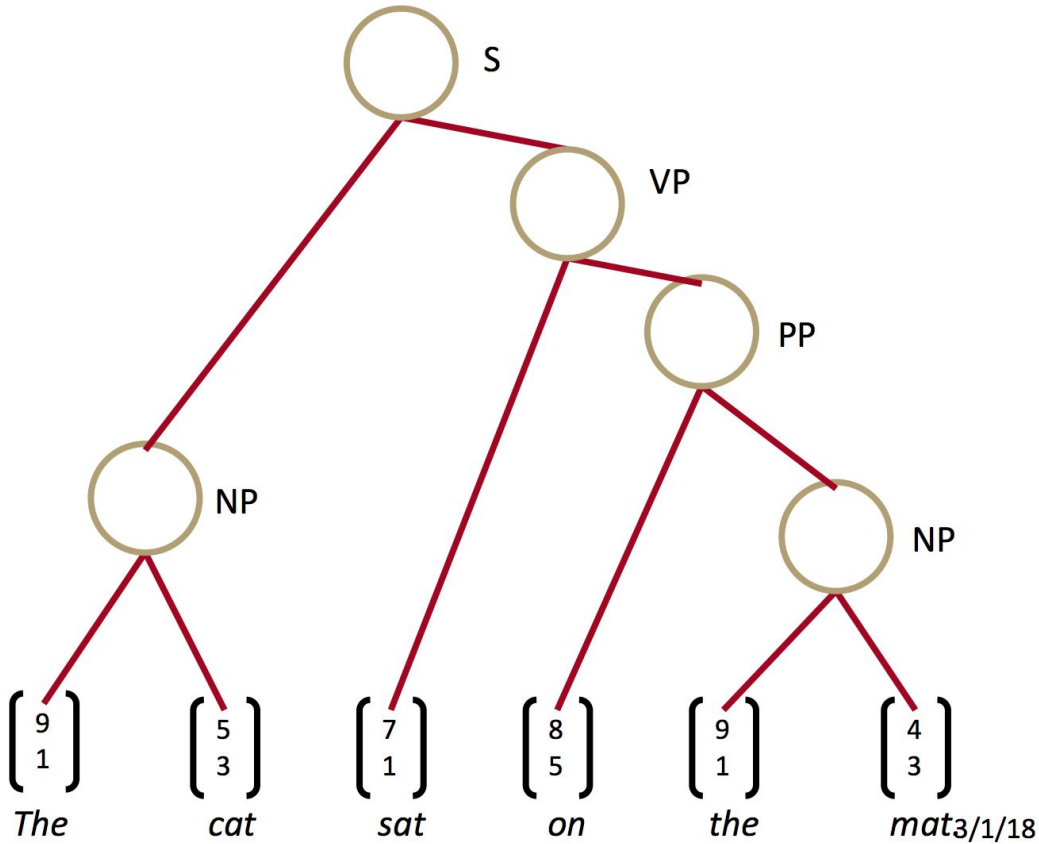


Models in this section can jointly learn parse trees and compositional vector representations

Learn Structure and Representation



Constituency Sentence Parsing: What we want



References

Speech and Language Processing (2nd Edition): Daniel Jurafsky, James H.

Slides 8-11 taken from CS244n Lecture