

Doubling DOP*

A comparison of Double-DOP and DOP*

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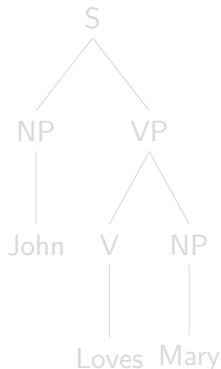
Summary

Parsing

- ▶ input: sentence

John Loves Mary

- ▶ output: constituent tree



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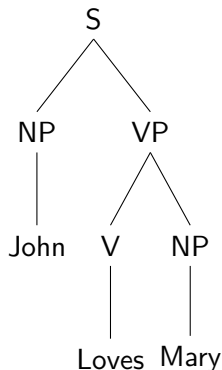
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Summary

- ▶ input: sentence

John Loves Mary

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A grammar describes:

- ▶ how trees can be built
 - ▶ CFG's - elementary rules
 - ▶ TSG's - larger units: *fragments*
- ▶ how likely constructions are: *probabilistic* grammars
 - ▶ PCFG's - independence
 - ▶ PTSG's - derivations

Grammar: CFG rules

$S \rightarrow NP VP$

$VP \rightarrow V NP$

$NP \rightarrow John$

$NP \rightarrow Mary$

$V \rightarrow loves$

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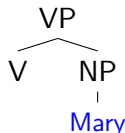
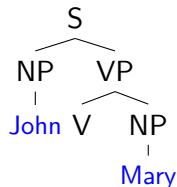
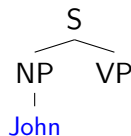
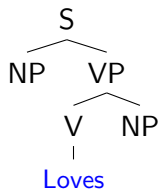
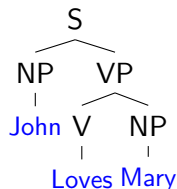
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Grammar: Tree fragments



Etc...
Exponentially many

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Consistency

- ▶ Assumption
 - ▶ Language is an infinite parse tree distribution
 - ▶ Treebank is a finite sample
- ▶ *Estimate* the true distribution
- ▶ Expected estimate should get better when the treebank grows → expected loss should decline
- ▶ **Consistency**: Expected loss is 0 when the sample size approaches ∞

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Double-DOP

- ▶ Extraction: Maximal Overlap
- ▶ Estimation: relative frequency
- ▶ Coverage: PCFG rules

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- ▶ Held-out estimation - *HC* and *EC*
- ▶ Extraction: Shortest derivations
- ▶ Estimation: relative frequency *in shortest derivations*
- ▶ Coverage: smoothing PCFG rules with probability p_{unkn}

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- ▶ Shortest derivations or Maximal overlap
- ▶ Held-out estimation or one vs. the rest

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Maximal overlap \leftrightarrow shortest derivation

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Split \leftrightarrow one vs. the rest

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F1 scores

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Summary

- ▶ The **first main message** of your talk in one or two lines.
- ▶ The **second main message** of your talk in one or two lines.
- ▶ Perhaps a **third message**, but not more than that.
- ▶ Outlook
 - ▶ Something you haven't solved.
 - ▶ Something else you haven't solved.

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