A Comparative Introduction to XDG: The Immediate Dominance Dimension

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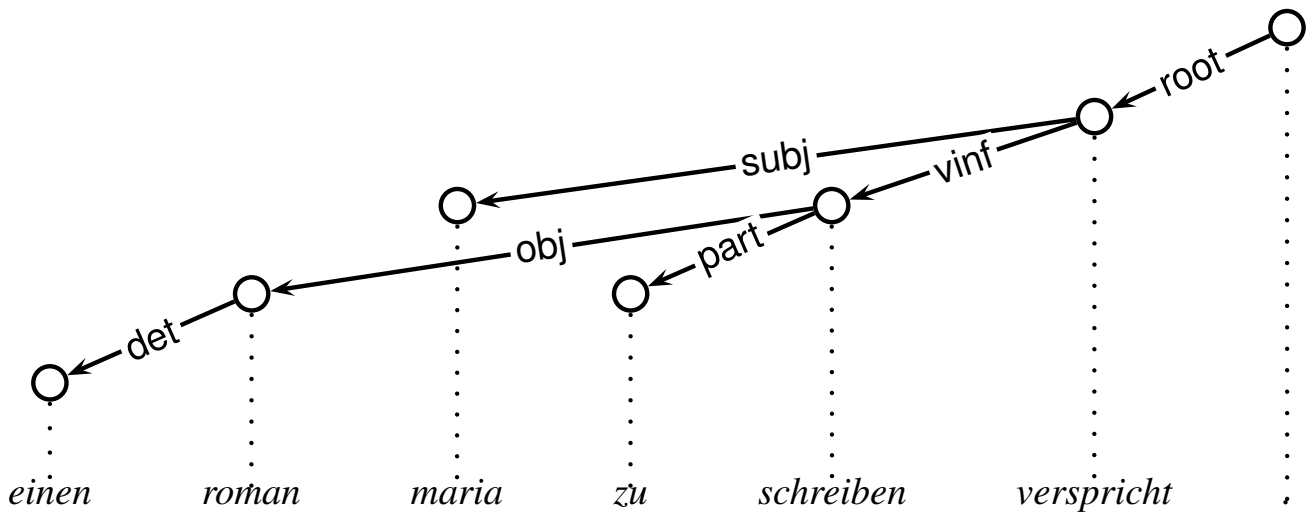
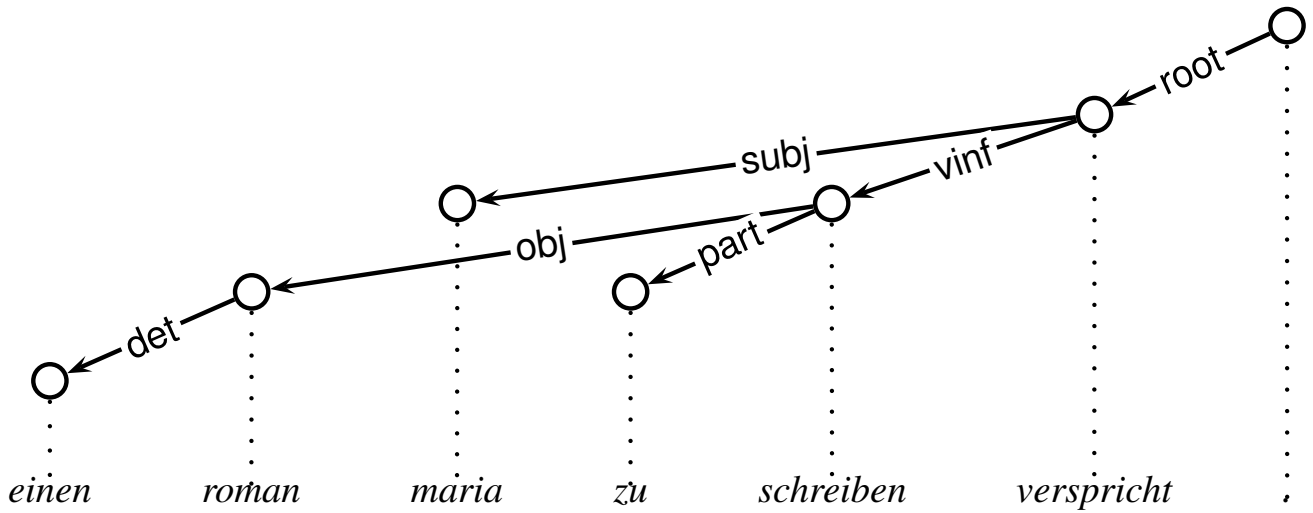
Immediate Dominance Dimension

- idea: model surface syntactic structure
- choices:
  - factor out word order
  - factor out deep dependencies (e.g. control, raising)



Specifying the class of models



- labeled trees
- edge labels: grammatical functions like subject, object, determiner etc.
- additional root node for the full stop for convenience

Subcategorization

- incoming edges: possible grammatical functions
- outgoing edges: required/optional grammatical functions

$$\textit{Roman} : \begin{bmatrix} \text{in} & : & \{\text{subj}?, \text{obj}?, \text{iobj}?\} \\ \text{out} & : & \{\text{det}!, \text{adj}*, \text{prep}?, \text{rel}?\} \end{bmatrix}$$

$$\textit{verspricht} : \begin{bmatrix} \text{in} & : & \{\text{sub}?, \text{rel}?, \text{root}?\} \\ \text{out} & : & \{\text{subj}!, \text{vinf}!, \text{adv}*, \text{prep}*\} \end{bmatrix}$$

Agreement

- restriction to case (nominative and accusative only) for simplicity
- concepts:
  - case assignment
  - case agreement
  - case government

Case assignment

- first idea: lexically:

$$\begin{array}{lcl} \textit{Frau}_1 & : & \left[\begin{array}{lcl} \mathsf{agr} & : & \mathsf{nom} \end{array}\right] \\ \textit{Frau}_2 & : & \left[\begin{array}{lcl} \mathsf{agr} & : & \mathsf{acc} \end{array}\right] \end{array}$$

- uneconomical. better: lexically assign a set of possible cases:

$$\textit{Frau} \quad : \quad \left[\begin{array}{lcl} \mathsf{agrs} & : & \{\mathsf{nom}, \mathsf{acc}\} \end{array}\right]$$

- use additional node attribute to pick out one of the cases for each node:

$$\forall v \in V \quad : \quad \mathsf{agr}(v) \in \mathsf{agrs}(v)$$

Case agreement

- for certain grammatical relations: case agreement
- e.g. for German, the determiners and adjectives agree with their nouns
- but nouns do not agree with their PPs and relative clauses
- i.e. set of agreeing edge labels: $\mathsf{agree} = \{\mathsf{det}, \mathsf{adj}\}$

$$\forall h \xrightarrow{l} d \quad : \quad l \in \mathsf{agree} \;\Rightarrow\; \mathsf{agr}(h) = \mathsf{agr}(d)$$

Case agreement contd.

- want to get more flexibility: lexicalize the set of agreeing edge labels:

$$\textit{Roman} \quad : \quad \begin{bmatrix} \mathsf{out} & : & \{\mathsf{det}!, \mathsf{adj}*, \mathsf{prep}?, \mathsf{rel}?\} \\ \mathsf{agree} & : & \{\mathsf{det}, \mathsf{adj}\} \end{bmatrix}$$

$$\forall h \xrightarrow{l} d \quad : \quad l \in \mathsf{agree}(h) \;\Rightarrow\; \mathsf{agr}(h) = \mathsf{agr}(d)$$

Case government

- for certain grammatical relations: heads restrict the agreement of their dependents
- e.g. for German and also English, finite verbs require their subjects to be nominative
- and transitive verbs require their objects to be accusative
- i.e. mapping of governed edge labels to agreement restrictions:

$$\begin{aligned} \mathsf{govern} \quad = \quad & \{\mathsf{subj} \mapsto \{\mathsf{nom}\}, \\ & \mathsf{obj} \mapsto \{\mathsf{acc}\}\} \end{aligned}$$

$$\forall h \xrightarrow{l} d \quad : \quad \mathsf{agr}(d) \in \mathsf{govern}(l)$$

Case government contd.

- want more flexibility: lexicalize the mapping of governed edge labels to agreement restrictions:

$$\textit{verspricht} \quad : \quad \left[\begin{array}{rcl} \mathsf{out} & : & \{\mathsf{subj!}, \mathsf{vinf!}, \mathsf{adv}*, \mathsf{prep}*\} \\ \mathsf{govern} & : & \{\mathsf{subj} \mapsto \{\mathsf{nom}\}\} \end{array} \right]$$

$$\forall h \xrightarrow{l} d \quad : \quad \mathsf{agr}(d) \in \mathsf{govern}(h)(l)$$