Typed Feature Structures for Multimodal Annotation

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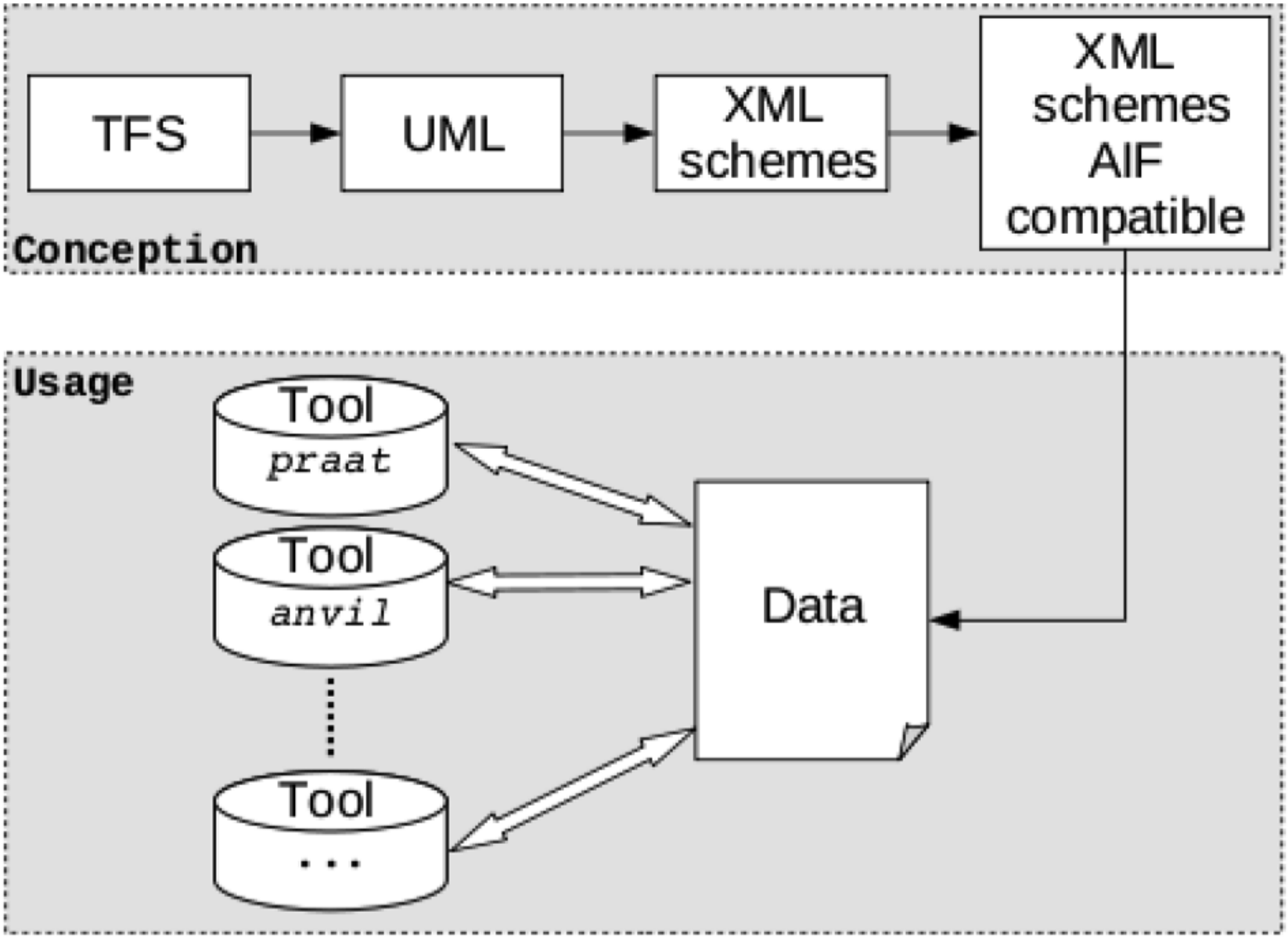
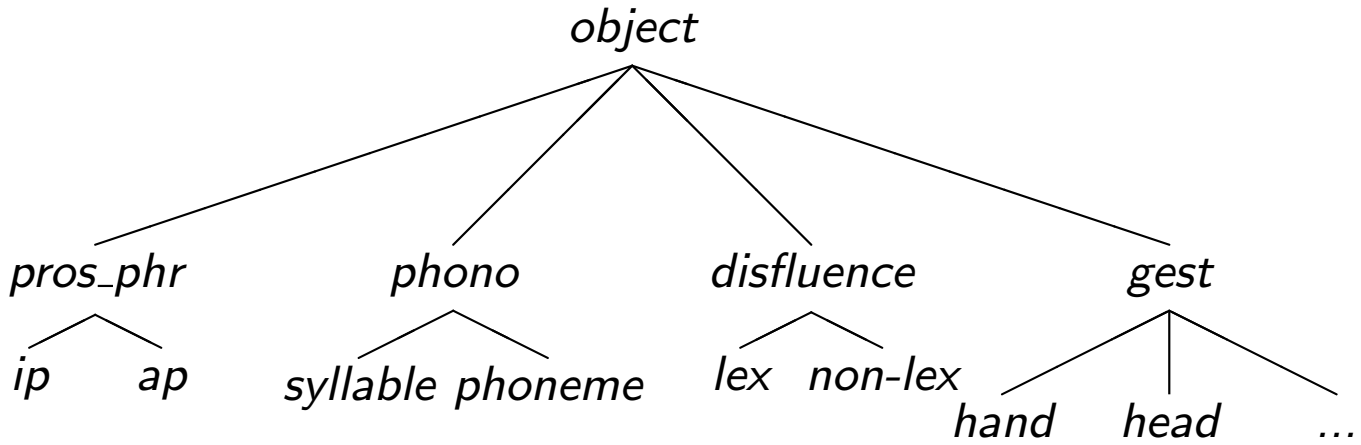
The Annotation Architecture



The OTIM Schema

- Type hierarchy



- Constituency hierarchy

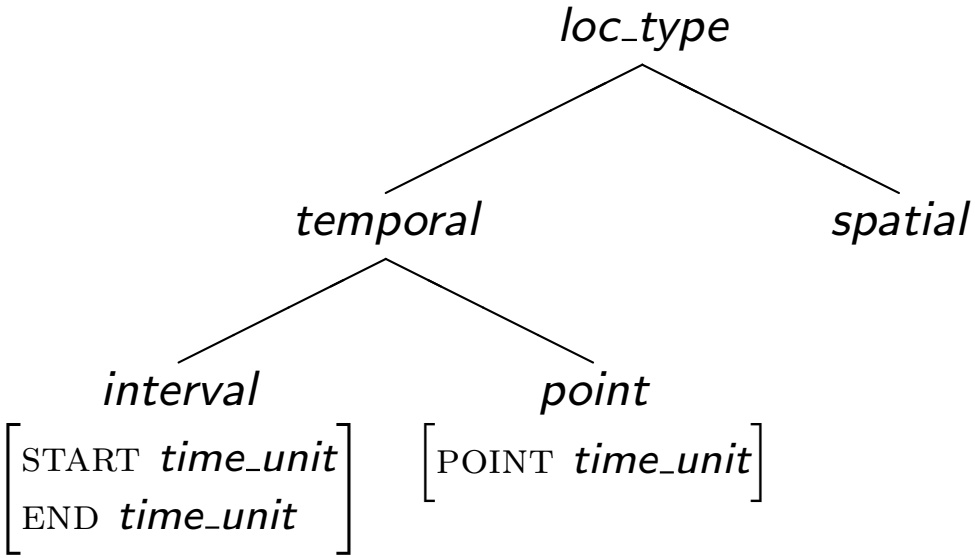
IP ::= AP*
AP ::= SYL$^+$
SYL ::= CONST_SYL$^+$
CONST_SYL ::= PHON$^+$
DISF ::= REPRANDUM BREAK REPRANS

The OTIM Schema

- Object type appropriate features

$$\textit{object} \begin{bmatrix} \text{INDEX } \textit{integer} \\ \text{LOCATION } \textit{loc_type} \end{bmatrix}$$

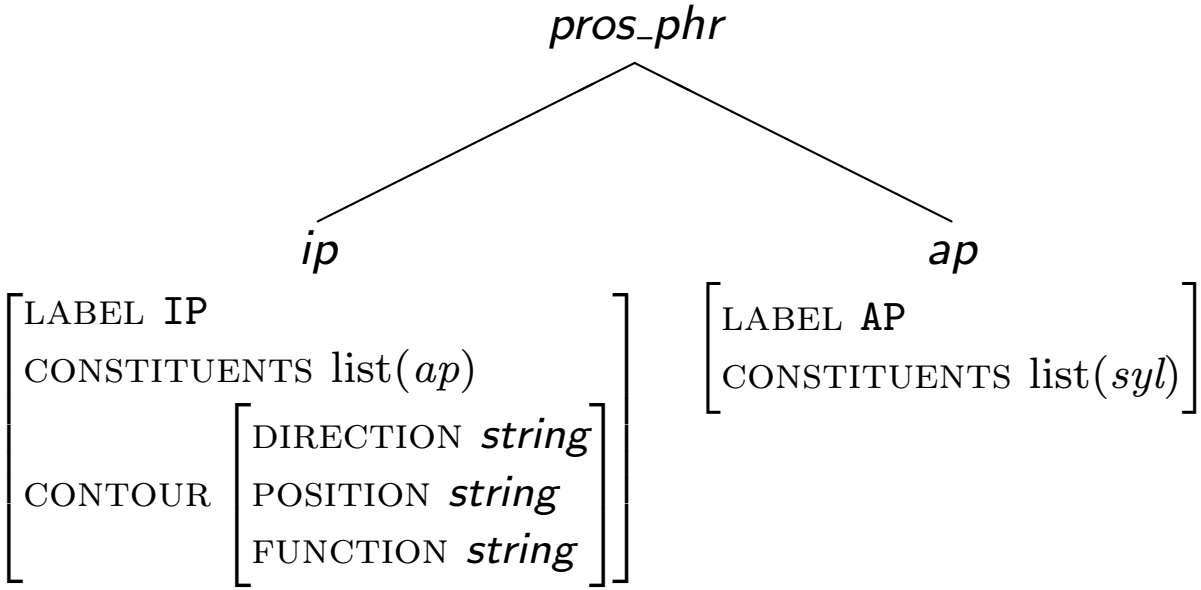
- Location type



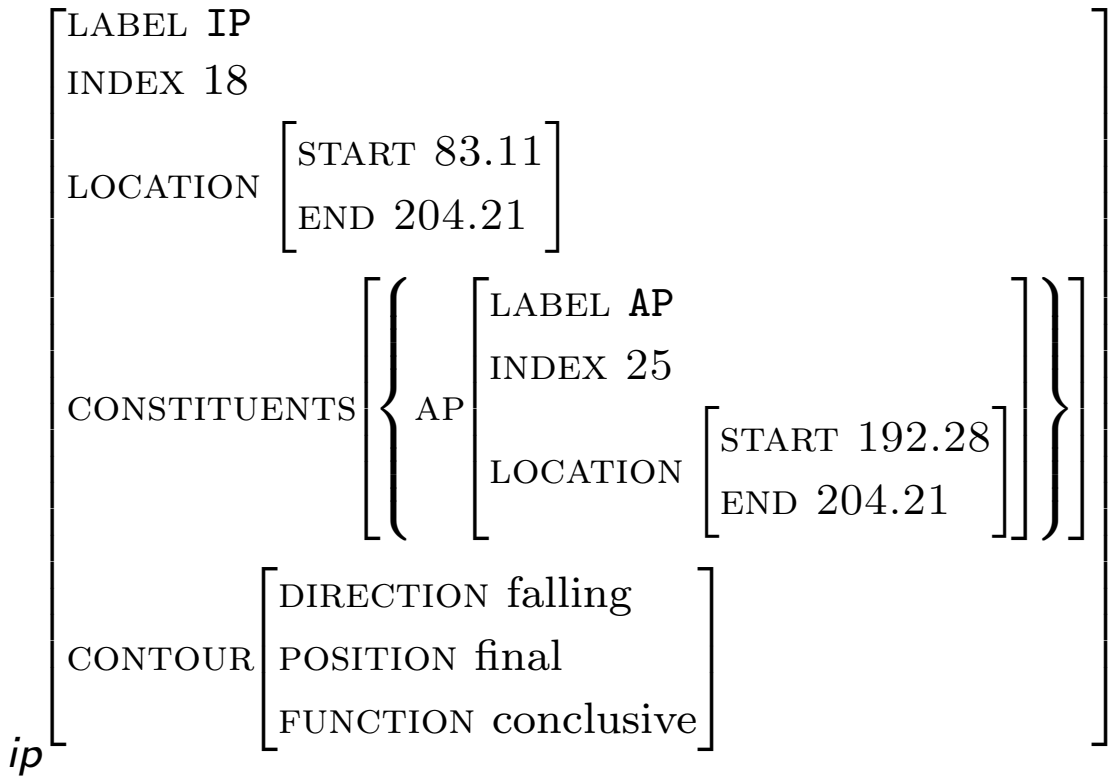
Phonetics

$$
\textit{phon}\left[\begin{array}{l}
\textsc{sampa_label}\ \textit{sampa_unit} \\
\textsc{cat}\ \{\textit{vowel},\ \textit{consonant}\} \\
\textsc{type}\ \{\textit{occlusive},\ \textit{fricative},\ \textit{nasal},\ \textit{etc.}\} \\
\textsc{articulation}\left[\begin{array}{l}
\textsc{lip}\left[\begin{array}{l}\textsc{protusion}\ \textit{string} \\ \textsc{aperture}\ \textit{aperture}\end{array}\right] \\
\textsc{tongue}\left[\begin{array}{l}\textsc{tip}\left[\begin{array}{l}\textsc{location}\ \textit{string} \\ \textsc{degree}\ \textit{string}\end{array}\right] \\ \textsc{body}\left[\begin{array}{l}\textsc{location}\ \textit{string} \\ \textsc{degree}\ \textit{string}\end{array}\right]\end{array}\right] \\
\textsc{velum}\ \textit{aperture} \\
\textsc{glottis}\ \textit{aperture}
\end{array}\right] \\
\textsc{role}\left[\begin{array}{l}\textsc{epenthetic}\ \textit{boolean} \\ \textsc{liaison}\ \textit{boolean}\end{array}\right]
\end{array}\right]
$$

Prosody


pros_phr
ip
ap
LABEL IP
CONSTITUENTS list(ap)
CONTOUR
DIRECTION string
POSITION string
FUNCTION string
LABEL AP
CONSTITUENTS list(syl)

Prosody: Example



Syllabic structure

$$\begin{bmatrix} \textit{syl} \\ \text{STRUCT } \textit{syl_struct} \\ \text{POSITION } \begin{bmatrix} \text{RANK } \{\textit{integer}\} \\ \text{SYL_NUMBER } \{\textit{integer}\} \end{bmatrix} \\ \text{ACCENTUABLE } \textit{boolean} \\ \text{PROMINENCE } \textit{boolean} \\ \text{CONSTITUENTS } \text{list}(\textit{const_syl}) \end{bmatrix} \quad \begin{bmatrix} \textit{const_syl} \\ \text{PHON } \text{list}(\textit{phon}) \\ \text{CONST_TYPE } \{\textit{onset}, \textit{nucleus}, \textit{coda}\} \end{bmatrix}$$

$$\begin{bmatrix} \text{LABEL} & \texttt{syl} \\ \text{INDEX} & 42 \\ \text{LOCATION} & \begin{bmatrix} \text{START } 195.12 \\ \text{END } 204.21 \end{bmatrix} \\ \text{CONSTITUENTS} & \left\{ \begin{bmatrix} \text{CONST_TYPE onset} \\ \text{PHON } /\texttt{f}/ \end{bmatrix}, \begin{bmatrix} \text{CONST_TYPE nucleus} \\ \text{PHON } /\texttt{u}/ \end{bmatrix}, \begin{bmatrix} \text{CONST_TYPE coda} \\ \text{PHON } /\texttt{l}/ \end{bmatrix} \right\} \\ \text{STRUCT} & \text{CVC} \\ \text{POSITION} & 3/3 \\ \text{ACCENTUABLE} & \text{false} \\ \text{PROMINENCE} & \text{false} \end{bmatrix}_{\textit{syl}}$$

Syllabic structure

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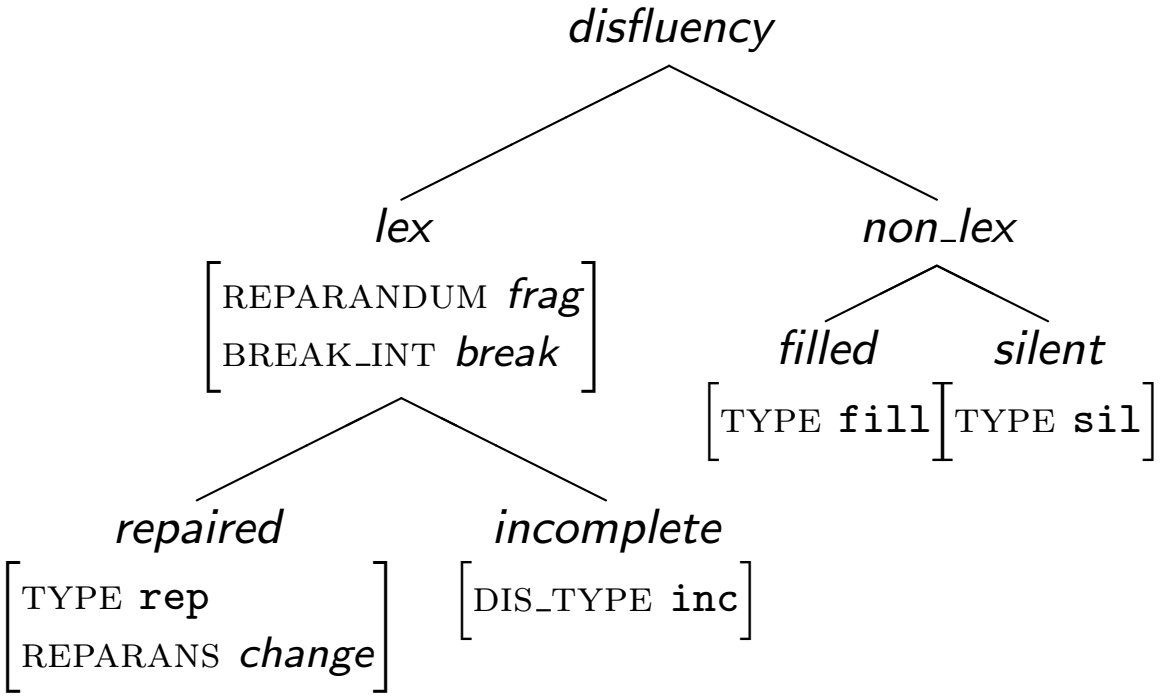
$$\textit{syl}\begin{bmatrix} \text{LABEL} & \texttt{syl} \\ \text{INDEX} & 42 \\ \text{LOCATION} & \begin{bmatrix} \text{START } 195.12 \\ \text{END } 204.21 \end{bmatrix} \\ \text{CONSTITUENTS} & \left\{ \begin{bmatrix} \text{CONST_TYPE onset} \\ \text{PHON } /\texttt{f}/ \end{bmatrix}, \begin{bmatrix} \text{CONST_TYPE nucleus} \\ \text{PHON } /\texttt{u}/ \end{bmatrix}, \begin{bmatrix} \text{CONST_TYPE coda} \\ \text{PHON } /\texttt{l}/ \end{bmatrix} \right\} \\ \text{STRUCT} & \text{CVC} \\ \text{POSITION} & 3/3 \\ \text{ACCENTUABLE} & \text{false} \\ \text{PROMINENCE} & \text{false} \end{bmatrix}$$

Disfluency


disfluency
lex
REPARANDUM frag
BREAK_INT break
non_lex
filled
TYPE fill
silent
TYPE sil
repaired
TYPE rep
REPARANS change
incomplete
DIS_TYPE inc