Towards a Semantic UD

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Semantic UD

Many similarities between enhanced UD and semantic dependencies

However, necessary arcs are sometimes absent in the enhanced UD

A full fledge enhanced UD enables semantic applications
The dog they adopted barks.

Another example: The dog they thought we admired barks.

Discrepancy: obj(admired, dog)?
Another example: The dog they thought we admired barks. Discrepancy: obj(admired,dog)?
Stephan left without paying
Other constructions

The guy we talked to arrived.
Affector(talked, we); ✓
Theme:to(talked, guy) ✗
Theme(arrived, guy) ✓

We used the car to go to Oslo.
Affector(go, we); ✗
Towards a Semantic UD Role Set

We know for certain that a semantic representation will capture (universal) predicate argument structure, which suggests we should take stock of what’s already out there.
VerbNet Hierarchy
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VerbNet approach is explicit, and thus intelligible, but is quite granular!
Consider the **EXCHANGE OF GOODS** frame

**Buyer [Byr]**  
*Excludes:* Exchangers  
The **Buyer** wants the **Goods** and offers **Money** to a **Seller** in exchange for them.  
Jess **BOUGHT** a coat.  
Lee **SOLD** a textbook to Abby.

**Exchangers [exch]**  
The **Buyer** and **Seller** considered jointly.

**Goods [Gds]**  
The FE **Goods** is anything (including labor or time, for example) which is exchanged for **Money** in a transaction.  
Kim **BOUGHT** the sweater.  
Kim **SOLD** the sweater.

**Money [Mny]**  
Money is the thing given in exchange for **Goods** in a transaction.  
Pat **PAID** 14 dollars for a movie ticket.  
Sam **SOLD** the car for $12,000.

**Seller [Slr]**  
*Excludes:* Exchangers  
*Non-Core:*  
The **Seller** has possession of the **Goods** and exchanges them for **Money** from a **Buyer**.

**Explanation [Exp]**  
*Semantic Type:* State_of_affairs  
The **Explanation** for which an event occurs.
FrameNet

- FrameNet approach is situationist in the truest sense, but per-frame variation in the argument space induces a lot of sparsity/doesn’t permit of a natural stopping point.
- An upside is that it gives you topical specificity, and is a natural starting point for commercial semantic ontologies.
Propbank-style Proto-roles (e.g. AMR)

(w / want-01
  :ARG0 (b / boy)
  :ARG1 (b2 / believe-01
    :ARG0 (g / girl)
    :ARG1 b))
While propbank goes beyond verbal predicates, a downside is that it uses proto-roles (e.g. Arg1 and Arg2), whose meaning in any context is only transparent when you reference an external lexicon.
Construct a more granular, explicit roleset from VerbNet and AMR

<table>
<thead>
<tr>
<th>role</th>
<th>subsumes</th>
</tr>
</thead>
<tbody>
<tr>
<td>AFFECTOR</td>
<td>AGENT, CAUSER, PRECONDITION</td>
</tr>
<tr>
<td>BENEFICIARY</td>
<td>EXPERIENCER, RECIPIENT</td>
</tr>
<tr>
<td>THEME</td>
<td>PATIENT, TOPIC, PREDICATE, PIVOT</td>
</tr>
<tr>
<td>INSTRUMENT</td>
<td>MEDIUM(AMR), MANNER(AMR)</td>
</tr>
<tr>
<td>SOURCE</td>
<td>MATERIAL, CONSIST-OF(AMR)</td>
</tr>
<tr>
<td>PATH</td>
<td>TRAJECTORY, EXTENT, DIRECTION(AMR), ...</td>
</tr>
<tr>
<td>CIRCUMSTANCE</td>
<td>CAUSE(AMR), CONCESSION(AMR), SUBEVENT(AMR), ...</td>
</tr>
<tr>
<td>...</td>
<td>...</td>
</tr>
</tbody>
</table>
The Upshot (cont’d)

Reduced granularity means you might have overlap in roles:

\[ I \text{ fed the } [\text{baby}]_{\text{INSTR}} \text{ for } [\text{Sarah}]_{\text{INSTR}} \]

A proposed solution to this issue is to subscript with the case marking:

\[ I \text{ fed the } [\text{baby}]_{\text{INSTR}} \text{ for } [\text{Sarah}]_{\text{INSTR.FOR}} \]

Thus reflecting a distinction in similar roles without making them more granular.