“Using inheritance and coreness sets to improve a verb lexicon harvested from FrameNet”

Mark McConville & Myroslava Dzikovska

Motivations for Role Set Reduction

Lexical Resource Comparison

<table>
<thead>
<tr>
<th></th>
<th>Frames/ Classes</th>
<th>Sub-frames/ Sub-classes</th>
<th>Role Labels</th>
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<td>FrameNet</td>
<td>362</td>
<td>9,180</td>
<td>440</td>
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<td>VerbNet</td>
<td>270</td>
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• Disambiguation
• Linking syntax and semantics
Composition of FrameNet Frames

buy (v), buyer (n), purchase_act (n), purchase (v), purchaser (n)
“I'll purchase every yard you've got.”
Using Inheritance Hierarchies to Reduce the Semantic Role Set

- **Getting** (Recipient)
  - **Commerce_buy** (Buyer)
    - **Renting** (Lessee)

- **Getting** (Agent)
  - **Commerce_buy** (Agent)
    - **Renting** (Lessee)
Getting (Agent)

Commerce_buy (Agent)

Renting (Agent)

Motion (Theme)

Self_motion (Self_mover)

Traversing (Theme)

Fluidic_motion (Fluid)

Motion (Theme)

Self_motion (Theme)

Traversing (Theme)

Fluidic_motion (Fluid)
Results for Inheritance Hierarchies

<table>
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<tr>
<th>Cycle</th>
<th>Full Lexicon Roles</th>
<th>Full Lexicon Frames</th>
<th>Restricted Lexicon Roles</th>
<th>Restricted Lexicon Frames</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>441</td>
<td>1256</td>
<td>289</td>
<td>807</td>
</tr>
<tr>
<td>1</td>
<td>364</td>
<td>1129</td>
<td>196</td>
<td>653</td>
</tr>
<tr>
<td>2</td>
<td>348</td>
<td>1083</td>
<td>177</td>
<td>596</td>
</tr>
<tr>
<td>3</td>
<td>347</td>
<td>1083</td>
<td>176</td>
<td>596</td>
</tr>
<tr>
<td>4</td>
<td>347</td>
<td>1083</td>
<td>176</td>
<td>596</td>
</tr>
<tr>
<td>5</td>
<td>347</td>
<td>1083</td>
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• First run: 21% reduction (347 roles)
• Second run: 39% reduction (176 roles)

Using Coreness Sets to Reduce the Semantic Role Set
“if we assume that…the roles are actually just alternative realizations of the same underlying semantic role, then we can condense all these frames into just one” (5).
**Motion**

**Coreness Set:** {Direction, Distance, Goal, Path, Source}
- The car moved [Direction] away.
- The car moved [Distance] for 100 yards.

**Coreness Set:** {Direction, Distance, Goal, Path, Source}
- The car moved [Direction] away.
- The car moved [Distance] for 100 yards.
- The car moved [Goal] into the slow lane.

**Coreness Set:** {Direction, Distance, Goal, Path, Source}
- The car moved [Direction] away.
- The car moved [Distance] for 100 yards.
- The car moved [Goal] into the slow lane.
- The car moved [Path] through the carpool lane.

**Coreness Set:** {Direction, Distance, Goal, Path, Source}
- The car moved [Direction] away.
- The car moved [Distance] for 100 yards.
- The car moved [Goal] into the slow lane.
- The car moved [Path] through the carpool lane.
- The car moved [Source] away from the berm.
Coreness Set: [Direction, Distance, Goal, Path, Source]

- The car moved [**Direction** away].
- The car moved [**Distance** for 100 yards].
- The car moved [**Goal** into the slow lane].
- The car moved [**Path** through the carpool lane].
- The car moved [**Source** away from the berm].
- The car moved [away from the berm through the carpool lane into the slow lane for 100 yards].

Results for Coreness Sets

<table>
<thead>
<tr>
<th>First Stage</th>
<th>Second Stage</th>
</tr>
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<tr>
<td>Frames Before</td>
<td>Frames After</td>
</tr>
<tr>
<td>9, 180</td>
<td>7,804</td>
</tr>
</tbody>
</table>

- 16% frame reduction
- Average 2.8 sub-frames per verb entry

**Stage 1**: Substitute labels with coreness sets; eliminate duplicate sub-frames

**Stage 2**: Check for frames with 2 or more arguments from coreness set; eliminate duplicate arguments