

LEARNING COMPLEX OUTPUT REPRESENTATIONS IN CONNECTIONIST PARSING OF SPOKEN LANGUAGE *

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ABSTRACT

Due to robustness, learnability and ease of integration of
different information sources, connectionist parsing systems
are promising for parsing spoken language.

figure 3.

```
([statement]
  ([sub-clause]
    ([agent]    his big brother+s friend)
    ([action]   loved)
    ([patient]  himself)))
```

Figure 3. Parse lacking structure

The important point to note here is that no internal analysis of the agent slot is performed by the system. In a machine translation framework the analysis above would not be sufficient to enable a regular mapping into the target language. A much more detailed analysis of the internal structure of e.g. the agent slot is needed.

Both problems above could be tackled by a symbolic rule based parsing system. However, ungrammatical sentences (which are frequently found in spontaneous speech) present a major problem. On the other hand, a robust system with its inherent robustness to handle such input without difficulty is needed.

Moreover, the implementation of such a system is limited.

```

([statement]
  ([sub]      ((form passive) (tense present)
              (mod ind) (agr sing-3))
              ;features of verb clause 1
    ([misc]   falls)
    ([agent]  ((case nom) (agr sing-3) (gender masculine)) ihr artikel) ;features of NP 1
  ([action]  akzeptiert)
  ([iaux]    wird))
  ([clause]  ((form active)
              (tense future) (mod ind) (agr plu-1))
              ;features of verb clause 2
    ([iaux]   werden)
    ([agent]  ((case nom) (agr plu-1)) wir) ;features of NP 2
    ([recipient] ((case dat) (agr pol-2)) ihnen) ;features of NP 3
    ([adverb] auch)
    ([patient] ((case acc) (agr plu-3) (gender neuter)) spezielle formulare); features of NP 4
  ([mod-1]  ((case acc) (agr sing-3) (gender masculine)) für ihren artikel) ;features of PP 1
  ([action] zusetzen)
))

```

Figure 4. Case frames annotated with features

The process of generating training from an abstract representation for the example sentence is given in figure 6. It shows the respective input "sentences" for all levels in the respective syntactic tree (cf. figure 5), where to put phrase boundaries, and how to label the respective phrases.

From the resulting more detailed syntactic analysis of input sentences it is much easier to define a mapping into some target representation e.g. an interlingua for machine translation or an SQL for database access. In a more detailed structure can be used for machine translations obtaining with only possible the s

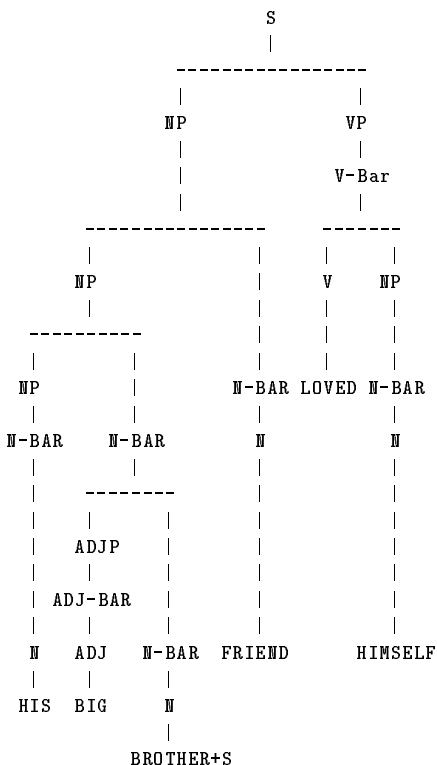


Figure 5. Structured parse tree

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Input Sentence:
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Input Sentence:
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Figure 6.

[10] M.F. S. *Knowledge-Cognitive Science*

[11] T.S. Pe. *of Anaphor* par tmen i