LEARNING COMPLEX OUTPUT REPRESENTATIONS IN CONNECTIONIST PARSING OF SPOKEN LANGUAGE *

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ABSTRACT

Due to robustness, learnability and ease of integration of
ferent information sources, connectionist parsing systems
or 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 systems. However, ungrammatical sentenc (which are frequently found in spontanuous spee sent a major problem On the other han system with its inherent robust of input with less difficu Moreover, the imp tems limite

```
([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]    ((formactive)
                  (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]                                                    zusenden)
))
```

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 machi lation or an SQL for data base access. In a detailed structure can be used [lations obtaining wi only possibl the s

```
                       S
                       |
               -----------------
               |               |
              NP              VP
               |               |
               |             V-Bar
               |               |
       ----------------     -------
       |              |     |     |
      NP              |     V    NP
       |              |     |     |
  -----------         |     |     |
  |        |          |     |     |
 NP        |        N-BAR LOVED N-BAR
  |        |          |           |
N-BAR    N-BAR        N           N
  |        |          |           |
  |    --------       |           |
  |    |      |       |           |
  |   ADJP    |       |           |
  |    |      |       |           |
  | ADJ-BAR   |       |           |
  |    |      |       |           |
  N   ADJ   N-BAR  FRIEND      HIMSELF
  |    |      |
 HIS  BIG     N
              |
           BROTHER+S
```

Figure 5. Structured parse tree

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```
Input Sentence:
Generating a
Generating a
Generating a
Generating a
Generating a
Generating a

Input Sentence:
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Input Sentence:
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Input Sentence:
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```

Figure 6.

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