

6. Conclusions

6.1. Verb grouping

One of the result of our work is categorization of Czech verbs according to their frames. Similar work was done by A. Horák (see Horák, 1998b) so we can compare our results.

Horák worked with the original BRIEF lexicon, and he did not try to separate single meanings of verbs or merge variants into one frame. In his approach, two verbs fall into one category if their lists of frames are identical. This means that every verb can only occur in one category, although it has several frames representing several meanings. Horák made four level of categorization: in 1st level, verbs are equivalent only if they share the same valency list; 2nd level has no surface realization of prepositional cases (they are supposed to be adjuncts and they are replaced by adverbial ‘semantic’ features). In 3rd level adjuncts are deleted from frames, and in 4th level the distinction between animate and inanimate members is removed.

	cl-brief	cl-opt	H 1st
number of classes	3560	3978	4537
number of verbs	15022	15022	15022
number of valencies	NA	NA	49566
three biggest classes	★ (1435) † (1000) ‡ (716)	★★ (1435) †† (1000) ‡‡ (685)	hTc4 (1420) hPTc4 (812) hTc7 (402)
no. of classes with 1 verb	1735 (48%)	1976 (49%)	2699 (59%)
no. of classes with 2 verbs	982 (27%)	1087 (27%)	1223 (27%)
no. of classes with 3 verbs	242 (6%)	276 (6%)	219 (5%)
no. of classes with more verbs	601 (19%)	639 (18%)	396 (9%)

★ R--s[i1]1[hPTc1]2[hTc4]%\$

★★ R--s[i1]1(hPTc1)2[hTc4]%\$

† R--s[i1]1[hPTc1]2[hPTc4]%\$

†† R--s[i1]1(hPTc1)2[hPTc4]%\$

‡ R--s[i1]1[hPTc1]2[hPTc4]2CM[hTc7]%\$

‡‡ R--s[i1]1(hPTc1)2[hPTc4]2CM(hTc7)%\$

Table 6.1.: Classification of verbs

We compare our results after merging the frames with Horák’s 1st level classification. In Table 6.1 the column *cl-brief* describes verb frames which were merged but obligatoriness was not marked. The column *cl-opt* describes merged frames with obligatoriness, and the column *H 1st* shows Horák’s results.

We can see that merging frames and identifying single meanings helps to decrease number of classes. It also changes the percentage of classes with one verb only and the number of classes with more verbs.

Next, we will work only with frames which were processed fully automatically and were fully resolved (this means every member of a frame is assigned only one inner participant or a free modification). Our set of verbs thus becomes smaller, but we can compare the percentage.

We removed all surface realizations of free modifications and left only the their functions in all frames. Such a lexicon can be compared with Horák’s 2nd level of classification, and the comparison is done in Table 6.2.

	adjunct-brief	adjunct-opt	H 2nd
number of classes	506	562	3188
number of verbs	6255	6255	15022
number of valencies	NA	NA	43175
three biggest classes	★ (1435) † (1000) ‡ (586)	★★ (1435) †† (1000) ‡‡ (348)	hTc4 (1420) hPTc4 (812) hA (553)
no. of classes with 1 verb	209 (41%)	236 (41%)	1780 (56%)
no. of classes with 2 verbs	117 (23%)	124 (22%)	884 (28%)
no. of classes with 3 verbs	45 (8%)	61 (10%)	155 (5%)
no. of classes with more verbs	135 (28%)	141 (27%)	369 (12%)

★ R-s[i1]1[hPTc1]2[hTc4]%%\$ ★★ R-s[i1]1(hPTc1)2[hTc4]%%\$
† R-s[i1]1[hPTc1]2[hPTc4]%%\$ †† R-s[i1]1(hPTc1)2[hPTc4]%%\$
‡ R-s[i1]1[hPTc1]2[hTc4]3[hPc3]%%\$ ‡‡ R-s[i1]1(hPTc1)2[hTc4]3[hPc3]%%\$

Table 6.2.: Classification of verbs with adjuncts simplified

We can see that the number of classes with one verb only decreased again. The next step in Horák’s work was to delete the hypothetical free modifications, but we do not think that this improves the classification. The number of classes decreases, but to the detriment of the accuracy. As free modifications can be obligatory participants of verb frames we cannot just delete all of them.

The next Horák’s step is suppressing the difference between animate and inanimate participants. We again do not agree that this helps to improve the results of sorting. Let us consider the verb *vystavit*:

- (139) a. *vystavit co komu*
 issue st_{Acc} sb_{Dat}
- b. *vystavit koho čemu*
 subject sb_{Acc} st_{Dat}

The surface realizations of the two constructions differ only in animacy of the participant, so we should not get rid of this information. We believe that the way which leads to better frame categorization is in improving the description of the verbs.

6.2. Further perspectives

We have shown a syntactic lexicon which can be used in various systems of natural language processing, especially in systems using symbolic methods (as opposed to stochastic methods). The lexicon, however, still needs some editing work, but we believe that it was pre-processed in such a way that the editing work will be easy. In the near future, the following things will be done:

1. An editor will be created with the help of which it will be possible to add new verbs and frames and to correct those already stored in the lexicon. A prototype of the editor already exists and now it is being tested on a small sample of the lexicon.
2. Some verb classes are categorized now as ambiguous, but they are homogeneous in that sense that the ambiguity can be resolved the same way for the whole class. This is the case of, for example, the class containing verbs with the frame R--s[i]1(hPTc1)2[hTc4]2CM(hTc7)%\$—the ambiguous member hTc7 will be assigned the functor Means for the whole class. It will be necessary to go through all classes and decide which of them can be resolved this way.
3. So far, only two types of diatheses have been added to verb frames. We also have to enhance the lexical entries by the information on other types of diatheses.
4. We have left aside idioms and phrases, but we have to include them in the lexicon as well. One problem is that they are not encoded in a unique way, and another that we have to create a format for them. There are also some theoretical problems with idioms, as whether the expressions in the “fixed” part of an idiom should be assigned functors or not, etc.

The lexicon can be used in many NLP applications, as parsing or tagging of Czech texts. One of the challenges is tagging of the Czech National Corpus. It has been tagged with the help of stochastic methods, but the results of the tagging made several linguists start work on a rule-based tagger (see Oliva et al., 2000). Though their achievements are admirable, a syntactic lexicon can improve their results even more.

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