Annotating Semantic Frames in RRGparbank

Tatiana Bladier, Kilian Evang, Laura Kallmeyer Heinrich Heine University Düsseldorf first.last@hhu.de

This paper describes the ongoing frame-semantic annotation of RRGparbank[3], a Introduction. multilingual parallel treebank for Role and Reference Grammar (RRG) that contains syntactic RRG annotations of George Orwell's novel 1984 and its translations. RRGparbank is one of the first resources for which RRG has been applied to large amounts of real-world data. Annotating RRGparbank with semantics creates new possibilities of data-driven NLP applications based on RRG, for example semantic parsers for various languages. The paper gives an overview of the decisions for annotating semantics of four languages in RRGparbank (English, German, French, and Russian). We also describe our annotation decisions for some selected linguistic phenomena. As a proof of concept for possible applications, we train a multilingual semantic parser on the treebank data.

Semantic annotation decisions. Semantic frames and roles are important for capturing semantic relations between the event participants and also between the sentences (for example to use for automated semantic reasoning). We follow the VerbAtlas frame lexicon [4] for annotation of semantic frames and roles in RRGparbank. We chose VerbAtlas because it uses a relatively small set of roles, which is good for training NLP models, but sufficiently large to represent different facets of meaning. Frames are also explicitly linked to English verbal word senses, covering all verbal synsets in WordNet [6], which is in turn linked to verb senses in other languages. Finally, the VerbAtlas roleset is to a large extent compatible with that of VerbNet [7], which is itself organized into a hierarchy from coarse-grained to fine-grained roles, which makes it possible to train models of differing granularity, depending on the application. Each sentence in RRGparbank is annotated independently by two linguistically trained annotators and afterwards adjudicated by a semantic expert.

We annotate only heads of semantic role spans and not full spans-for example, if the NP the swift answer fills a Theme role, the word answer is annotated as Theme. The full spans of semantic roles can be reconstructed deterministically from the corresponding syntactic trees. Figure 1 shows an example of the annotation interface. The rows represent semantic frames along with the annotated semantic roles. The frame labels are given in all capital letters. Each sentence is annotated independently by two linguistically trained annotators and afterwards adjudicated by a semantic expert.

Selected phenomena. We define verbal idioms as verbs with fixed figurative meanings that have one or more fixed arguments. We annotate the frame and roles for non-fixed arguments based on the figurative meaning, and fixed arguments with the pseudo-role VID.

- (1)Verbal idioms

 - a. Don't spill_[SPEAK] the beans_[VID] b. Are you_[Agent] pulling_[JOKE] $my_{[Theme]} leg_{[VID]}$?

If a verb is used figuratively outside of a fixed idiom and no synset explicitly covers that figurative use, we choose a frame and roles based on the literal meaning.

- Figurative Use of Predicates (2)
 - Die Augen_[Agent] bohrten_[HOLE_PIERCE] sich_[Reflexive] tief_[Extent] a. themselves The eves pierced deeply in Winstons Blick_[Destination] in Winstons's eyes 'the eyes looked deep into Winston 's own '

We annotate light verbs with the predicate that the dependent expresses, and mark the dependent with the special role LVC.



Figure 1: Frame-semantic annotation interface for RRGparbank.

(3) *Light verbs*

- a. $I_{[Agent]}$ 'm taking_[WASH_CLEAN] a bath_[LVC]
- b. Уинстон_[Agent] опустил руки и сделал_[BREATH_BLOW] медленный_[Attribute], Winston sank arms and made slow , ^{глубокий}[Attribute] ^Bдох_[LVC] deep breath 'Winston sank his arms and drew a slow deep breath'
- c. Der zusätzliche halbe Liter_[Theme] machte_[SHOW] $sich_{[Reflexive]}$ bemerkbar_[LVC] The extra half litre made itself noticeable 'The extra half-litre was already working on him'

Frame-semantic parsing. We apply the RRG-based frame-semantic parser described in [2] to the annotated RRGparbank data. This neural parser allows for simultaneous prediction of RRG syntax and semantics and has state-of-the performance for the English data. We will provide more details on semantic parsing with RRGparbank by the time of the conference.

Outlook. In our future work we plan to semantically annotate all sentences in the subcorpora of RRGparbank and to train RRG-based neural language models for simultaneous syntactic and framesemantic parsing in different languages. We would also like to explore the methodology for crosslingual parsing developed in [5] to develop RRG-based parsing systems for low-resource languages. In order to enable semantic inference and logical reasoning with the annotated data, we currently investigate possibilities to develop a frame hierarchy, for example based on mapping the VerbAtlas frames to frames from FrameNet [1].

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