

## A Neural Approach to Discourse Relation Signaling

Discourse relations marking connections between utterances (‘concession’, ‘justification’, etc.) are essential for successful communication. Identifying signals marking them is therefore an important but challenging task, since signals are often subtle and ambiguous. Previous work (Knott & Sanders 1998, Taboada & Das 2013) has focused on distinctive collexeme analysis, identifying correlations between markers such as ‘although’ or ‘actually’ and annotations in frameworks such as Rhetorical Structure Theory. A key limitation of this approach is using single global score for each candidate, with no distinction between contexts. This prevents common words like ‘and’ from being identified as signals in context.

This paper takes a computational approach using Recurrent Neural Networks (RNNs) in a biLSTM-CRF architecture (Ma & Hovy 2016), applied for the first time to the task of signal detection. Using a training corpus of 64,000 tokens annotated for 4,700 instances of 20 discourse relations in four English genres, the proposed network uses contextual memory of preceding and following words to flag discourse segments which ‘convince’ it of the correct relation, as in (1)-(2).

- (1) [A ceramic bowl **will work best** ,]<sub>elaboration</sub> [**but plastic works too** .]<sub>concession</sub>  
(2) [**Ideally** the quaffle and bludgers should be **slightly** deflated]<sub>elaboration</sub>

The talk will discuss a variety of signals that are missed by frequentist approaches, and quantify signal ambiguity based on dispersion of scores assigned by the network to different instances of the same markers.

### References

- Knott, A., & Sanders, T. (1998). The Classification of Coherence Relations and their Linguistic Markers. *Journal of Pragmatics*, 30(2), 135–175.
- Ma, X., & Hovy, E. (2016). End-to-end Sequence Labeling via Bi-directional LSTM-CNNs-CRF. *Proc. ACL 2016*, 1064–1074.
- Taboada, M., & Das, D. (2013). Annotation upon Annotation: Adding Signalling Information to a Corpus of Discourse Relations. *Dialogue and Discourse*, 4(2), 249–281.