Multitask Parsing Across Semantic Representations

Daniel Hershcovitch\(^1\,2\) & Omri Abend\(^2\) & Ari Rappoport\(^2\)
\(^1\)The Edmond and Lily Safra Center for Brain Sciences
\(^2\)School of Computer Science and Engineering
The Hebrew University of Jerusalem  \{danielh,oabend,arir\}@cs.huji.ac.il

We present a general DAG parser for UCCA, AMR, SDP and UD, and show that multitask learning improves UCCA parsing.

Training data for parsing semantic representations is scarce. We consider four schemes:

UCCA: Intuitive, cross-lingual, and modular semantic representation. Primary edges form a tree. Remute edges (dashed) allow reentrancy, creating a directed acyclic graph [1].

AMR: Abstract graph on concepts and constants. Rooted DAG with labeled nodes and edges. Encodes named entities, argument structure, semantic roles, word sense, conference [3].

SDP: Set of related bilexical semantic DAG schemes: DM, PAS, PSD and CCD. We use DM (DELPH-IN MBS). Encodes argument structure for many predicate types [7].

UD: Cross-lingual syntactic bilexical tree. Encodes syntactic relations between words [6]. UD++ (Enhanced+ UD) adds and augments edges, creating a bilexical DAG [8].

Multitask learning exploits task overlap, effectively extending the training data. We focus on UCCA parsing due to its small training set.

As auxiliary tasks, we use unlabeled AMR, SDP and UD parsing.

Data

UCCA: (1) English Wikipedia (Wiki); (2) Twenty Thousand Leagues Under the Sea (20K), annotated in English (small, only test) French (small), and German (pre-release, noisy).

AMR: LDC2017T10 (English). SDP: DM part from SDP 2016 (English) UD v2.1 treebanks: English (UD+), French and German. Only for training. Number of sentences per dataset:

20K Wiki AMR SDP UD
506 3225 3632 13814
17682
6514

Unified DAG Format

We convert all representations into a format similar to UCCA and supported by TUPA. Multitask learning consistently improve UCCA parsing when compared to single-task.

Task Similarity

Does improvement depend on structural task similarity, or training corpus similarity? We compared annotations of 100 WSJ sentences, and training corpus word distributions.

References

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tinyurl.com/semeval-ucca