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Similarity-Driven Semantic Role Induction via Graph Partitioning

Joel Lang and Mirella Lapata

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Abstract **Full Text** **Authors**

As in many natural language processing tasks, data-driven models based on supervised learning have become the method of choice for semantic role labeling. These models are guaranteed to perform well when given sufficient amount of labeled training data. Producing this data is costly and time-consuming, however, thus raising the question of whether unsupervised methods offer a viable alternative. The working hypothesis of this article is that semantic roles can be

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induced without human supervision from a corpus of syntactically parsed sentences based on three linguistic principles: (1) arguments in the same syntactic position (within a specific linking) bear the same semantic role, (2) arguments within a clause bear a unique role, and (3) clusters representing the same semantic role should be more or less lexically and distributionally equivalent. We present a method that implements these principles and formalizes the task as a graph partitioning problem, whereby argument instances of a verb are represented as vertices in a graph whose edges express similarities between these instances. The graph consists of multiple edge layers, each one capturing a different aspect of argument-instance similarity, and we develop extensions of standard clustering algorithms for partitioning such multi-layer graphs. Experiments for English and German demonstrate that our approach is able to induce semantic role clusters that are consistently better than a strong baseline and are competitive with the state of the art.


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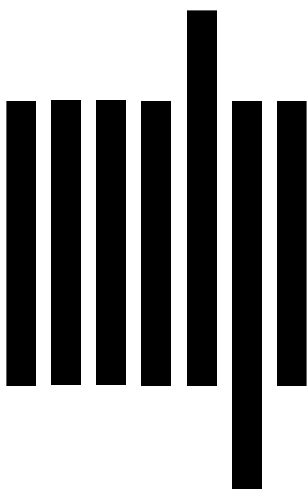
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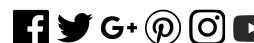
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