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**Learning to Extract Action Descriptions from Narrative Text**

**Abstract**

This paper focuses on the mapping of natural language sentences in written stories to a structured knowledge representation. This process yields an exponential explosion of instance combinations since each sentence may contain a set of ambiguous terms, each one giving place to a set of instance candidates. The selection of the best combination of instances is a structured classification problem that yields a high-demanding combinatorial optimization problem which, in this paper, is approached by a novel and efficient formulation of a genetic algorithm, which is able to exploit the conditional independence among variables, while improving the parallel scalability. The automatic rating of the resulting set of instance combinations, i.e., possible text interpretations, demands an exhaustive exploitation of the state-of-the-art resources in natural language processing to feed the system with pieces of evidence to be fused by the proposed framework. In this sense, a mapping framework able to reason with uncertainty, to integrate supervision and evidence from external sources, was adopted. To improve the generalization capacity while learning from a limited amount of annotated data, a new constrained learning algorithm for Bayesian networks is introduced. This algorithm bounds the search space through a set of constraints which encode information on mutually exclusive values. The mapping of natural language utterances to a structured knowledge representation is important in the context of game construction, e.g., in an RPG setting, as it alleviates the manual knowledge acquisition bottleneck. The effectiveness of the proposed algorithm is evaluated on a set of three stories, yielding nine experiments. Our mapping framework yields performance gains in predicting the most likely structured representations of sentences when compared with a baseline algorithm.