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Enhancing Semantic Parsing with Graph Neural Networks: Improving Natural Language to Formal Representation Mapping

Semantic parsing, the task of mapping natural language text to formal representations, can benefit greatly from advanced neural network architectures. Graph Neural Networks (GNNs) offer a promising approach by modeling text as complex graphs, where nodes represent linguistic elements and edges denote their semantic and syntactic relationships. Inspired by the work of Malekzadeh et al. (2021) on GNNs for text classification, this study explores how GNNs can be adapted to enhance semantic parsing. Conventional parsing methods often struggle with capturing the nuanced dependencies within text due to their linear or shallow nature. This research introduces a novel application of GNNs to represent and process text in a graph-based format, integrating sophisticated models and contextual information to improve parsing accuracy. Through rigorous evaluation on standard benchmarks, the proposed method demonstrates significant advancements over traditional techniques, offering a fresh perspective on leveraging GNNs to tackle the complexities of semantic parsing.

Keywords: Semantic Parsing, Graph Neural Networks, GNNs, Natural Language Processing, Formal Representations, Graph-Based Models, Deep Learning, Text Graphs, Syntactic Relationships, Semantic Relationships, Benchmark Evaluation.

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