
Meaning Representations for Natural Languages Tutorial Part 5

Open Questions and Future Work

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Future work

- Producing more UMR-annotated data sets for more languages
- More accurate and more robust SRL/AMR/UMR parsers
- New MS-AMR/UMR parsers that can parse text into document-level graphs
 - MS-AMR/UMR evaluation metrics
- Exploring the trade-off/complementarity between LLMs and MR systems in NLP applications

Open Questions - Symbolic MRs vs LLMs?

- More extreme scenarios
 - As an alternative to LLMs, for scenarios where transparency is of paramount importance in every module of an NLP system?
 - MRs have no role at all, as MR-based systems vastly underperform end-to-end deep learning system due to error propagation?
- Between the two extremes:
 - As an intermediate representation that can be used to train semantics-aware LLMs, to help with the robustness and generalizability of LLMs?
 - As a layer on top of LLMs, to help with explainability and controllability of LLM-based systems?
 - As a way of computing rewards for LLM-based systems in an RL framework to improve applications that produces output similar to MRs (e.g., event argument extraction) ?

MRs have been used to improve many applications

- Information Extraction: Exploiting similarities between AMR with information networks
- Machine Translation: combining AMR graphs with sequence representations
- Text Summarization: Condensing documents into summary graphs to generate summary sentences
- Question Answering: Knowledge graph QA, multi-hop reasoning
- Dialog systems: Using a graph transformer in a sequence-to-sequence system.
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New research opportunities that MRs provides in the era of LLM-based systems

- Extracting facts that help train LLM-based systems to respect the facts
- Generating data sets with logical representations to improve the logical reasoning capabilities of LLM-based systems
- Improving multi-hop reasoning in LLM-based QA systems
- Providing an induction bias in low-resource scenarios
- Providing a representation in dialogue systems where more control is needed in dialogue state tracking.
- ...

Open Questions: Can MRs help with reasoning?

- LLMs are arguably deficient in terms of mathematical and logical reasoning. This might be an area where AMR/UMR can help, but under-explored.

Open Questions: Can MRs help LLMs be more truthful?

- LLMs are known to hallucinate things. Can MRs be used to extract facts that can help train LLMs that are more truthful?